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NATURAL ADVANCED GEOGRAPHY



REDWAY
AND
HINMAN

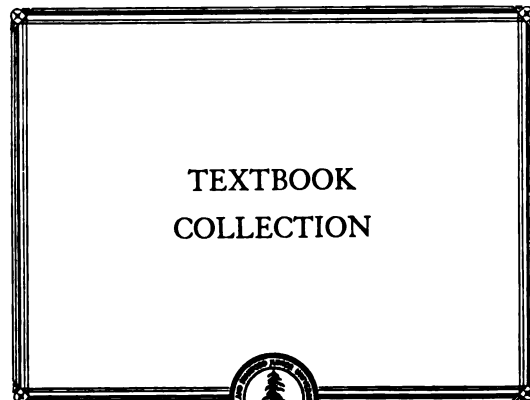
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THE NATURAL GEOGRAPHIES

NATURAL ADVANCED GEOGRAPHY

BY

JACQUES W. REDWAY

AND

RUSSELL HINMAN

Author of the "Eclectic Physical Geography"



DEPARTMENT OF EDUCATION
LELAND STANFORD JUNIOR UNIVERSITY

NEW YORK ··· CINCINNATI ··· CHICAGO
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632342 PREFACE.

THE Natural Advanced Geography forms, with the Elementary book of this series, a complete and rational school course in the study of geography as recommended by the Committee of Fifteen.

In its newer aspects school geography demands much that is not to be found in the older text-books, as a glance through this volume will indicate. One of its prime requirements is the arrangement of the apparently isolated and unrelated facts of geography into such order that their correlation may be perceived and the unity of nature recognized. When the subject is thus studied in orderly sequence, it unfolds itself naturally and logically, each lesson preparing the way for those which follow, and for this reason the *new geography* is found to be not only more interesting and useful than the old, but vastly more intelligible, and hence much easier for both the pupil and the teacher.

Throughout the Natural series the central thought is Man in his relations to his physical environment, but the plan of treatment is essentially different in the two books. In the Elementary the young pupil is led to observe the peculiarities of man and nature about his own home, and with these standards of comparison he is gradually led to a conception of the world as a whole. This Advanced Geography, however, treats first of the earth as a whole, and of the general manner in which its physical features, its plants, its animals, and its human inhabitants have reached their present condition and distribution through centuries of change and development. This part of the subject has been presented with considerable detail, because of its fundamental importance. No country or people has attained its present condition unaffected by the influences of other, and often of very remote regions. The remainder of the book is devoted to the various parts or countries of the earth. The development of each part is studied and analyzed in the light of the preceding lessons on the Earth as a Whole, and thus true relationships are established.

The Topics for Oral and Written Work and the exercises in Correlations and Comparisons which have been inserted at convenient intervals in this book not only serve as reviews, but are so framed that they stimulate thought and lead the pupil to view what he has learned from a somewhat different standpoint. These features form a nucleus for the "laboratory work" now recognized as an essential feature in the study of geography.

The optional Supplemental Work at the ends of the various sections is not essential to the course, but it abounds in suggestions for appropriate collateral reading and for variations in the exercises of the class or of individual pupils. This work the teacher may use to the extent which time and circumstances permit.

Corresponding maps throughout the book are drawn on the same scale, and therefore prevent the pupil from forming the usual misconceptions regarding the comparative size of countries. A single scale serves for the colored maps of all the grand divisions; a single, but larger scale, for the maps of the United States and Europe; and a single, but still larger scale, for the sectional maps — with the exception of that of New England, which is drawn on three times the scale of the others. On the physical maps, the relief features are shown by contour lines in the manner now used on the best topographical maps issued by the government.

The pictures have been generally engraved directly from photographs, and have been selected and arranged solely for the purpose of illustrating the accompanying text. The photograph of the Great Barrier reef reproduced on p. 21 was kindly loaned by the American Museum of Natural History, New York city.

Acknowledgments are due to Miss Louise Connolly and to Miss Carl L. Garrison of the Washington (D. C.) schools for valuable assistance in revising and perfecting the manuscript.

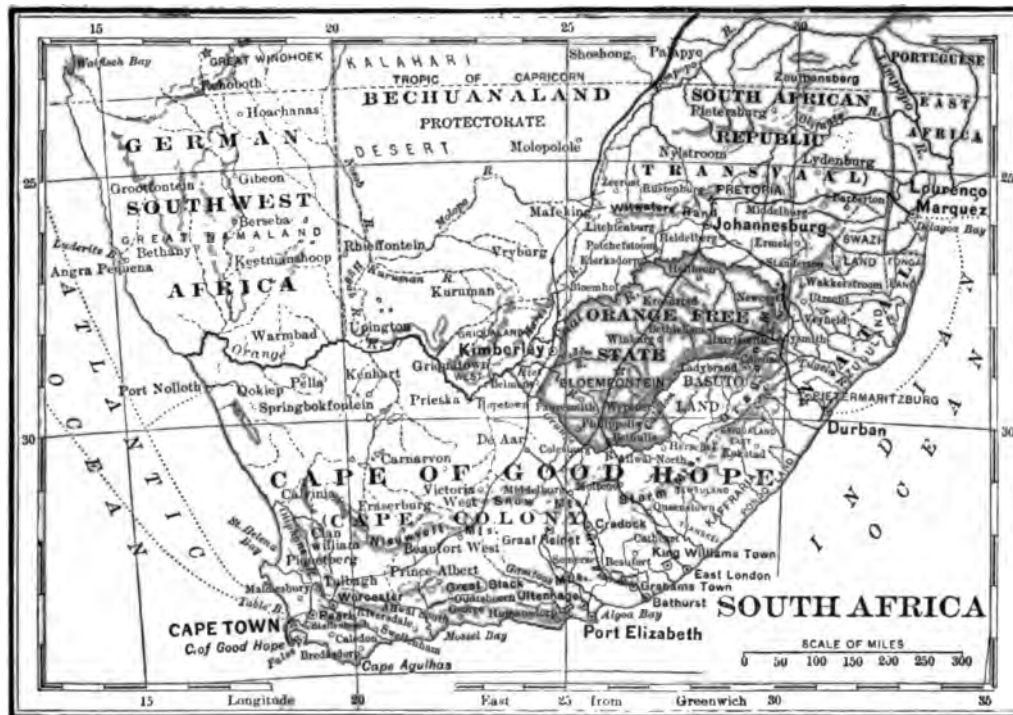
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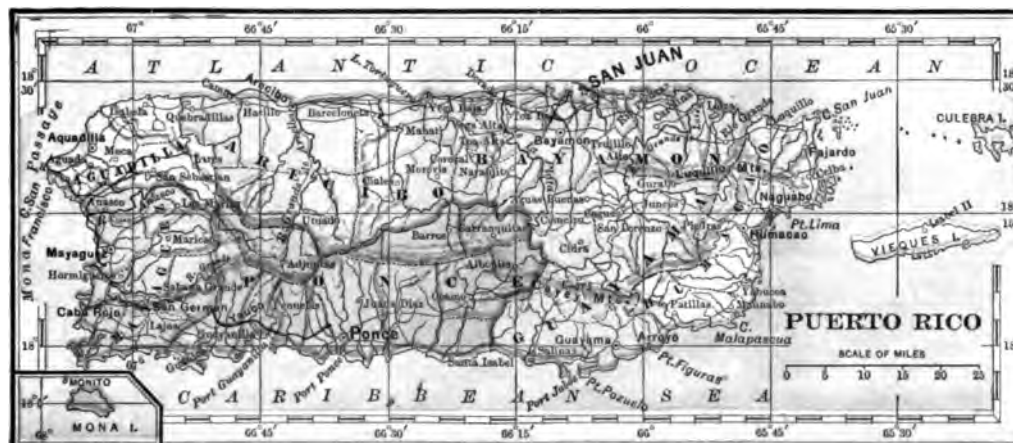
NATURAL ADV. GEOG.
W. P. 31

GEOGRAPHICAL BULLETIN.



The South African Republic has about the area of Nevada and about the population of Maine. Orange Free State is about as large as New York state, and has about the same population as Utah.

Pretoria to	Delagoa Bay by rail, 280 miles (New York to Buffalo).
	Durban by rail, via Ladysmith, 370 miles (Buffalo to Fort Wayne).
	Bloemfontein by rail, 270 miles (Buffalo to Toledo).
	Mafeking, 170 miles (New York to Boston).
	Port Elizabeth by rail, 390 miles (Toledo to St. Louis).
Bloemfontein to	East London by rail, 320 miles (Toledo to Peoria).
	Cape Town by rail, 670 miles (Toledo to Topeka).
	Kimberley, 100 miles (New York to Philadelphia).
Kimberley to Cape Town by rail, 600 miles (Chicago to Atlanta).	



CUBA.

Physical Features. Cuba is the largest and most western of the islands embraced in the West Indies. The long chain of the West Indies is a partly submerged range of mountains, reaching its highest elevation in Haiti.

The island of Cuba is long and narrow. Its length is 720 miles—equal to the distance from New York to Cincinnati; its breadth is 80 miles. Its area, including 1300 keys, or coast islands, is nearly 46,000 square miles—a little larger than Pennsylvania.

The irregular coast line has a length of 7000 miles, and is bordered by coral reefs. From the lowland of the coast fertile meadows and plains extend inland to the foothills of the central mountain system. The longest range of this system is the Sierra de los Organos, which forms the chief watershed of the island. The general course of most of the rivers is either north or south.

The Climate is tropical, but is considerably cooled by the ocean breezes. In the mountain districts a mild atmosphere prevails. At Havana the average temperature for the year is 77°.

There are two seasons in the year—a wet from May to October, and a dry during our winter. Thunderstorms are frequent. Severe tropical storms, or hurricanes, are of almost yearly occurrence, and are often very destruc-



A large sugar plantation, Cuba.

tive. Earthquakes occur in eastern Cuba, but are seldom felt in the western parts.

The Forests cover half the island. Of palms there are over thirty species. Among the valuable woods are mahogany, lignum-vitæ, ebony, logwood, and the fragrant cedar of which cigar boxes are made.

Agricultural Products. The soil is remarkably rich and almost inexhaustible. The chief products are sugar cane, introduced in 1523; tobacco, the best quality growing west of Havana; coffee, most productive on the mountain slopes of the east; oranges, growing spontaneously in nearly all localities; bananas, mostly in the eastern provinces; and pineapples, most abundant in the west.

During the period of prosperity there were in Cuba extensive cattle farms, cotton plantations, orchards, and market gardens; but during the late war with Spain these were partly or wholly destroyed.

Mineral Resources. Neither gold nor silver has been found in paying quantities. Rich mines of copper and iron are worked in the vicinity of Santiago. Near Santa Clara is a large bed of asphaltum.

The Industries of Cuba are mainly agriculture and the trade which grows out of it. Except the making of cigars, manufactures were never encouraged by the Spaniards, and there are no mills or factories of importance. Inland commerce is aided by about 1000 miles of railroad. The common roads are mostly little more than footpaths, and goods are carried by means of ox carts and mules.

For the purposes of foreign commerce no other island in the world, in proportion to its size, has a larger number of excellent harbors. The principal exports are sugar, tobacco, tropical fruits, molasses, and lumber. The imports are chiefly wheat and flour, rice, petroleum, and all manufactured articles.

History and People. Cuba was discovered by Columbus, October 28, 1492, and was named by him Juana. Afterwards it was

known by several different names, but finally retained the title Cuba, which the natives had given it before the discovery.

The first permanent settlement was made by Diego, the son of Columbus, in 1511. Havana was founded in 1519, was captured by the British in 1762, and in 1763 was restored to Spain by the treaty of Paris.

The tyranny of the captains general appointed by the Spanish government to rule the island, together with oppressive taxation and the denial of political rights, incited five noted rebellions among the Cubans, the last—the war for independence—beginning in 1895. The war ended with the victory of the United States over Spain in 1898, followed by a treaty by which Spain relinquished her sovereignty in the West Indies, and Cuba passed into the control of the United States, pending the establishment of a government by the Cubans themselves.

The census of 1887 gave the population of the island as 1,631,687, of which about one third were colored. Not less than 300,000 of the people are believed to have perished during the war. The inhabitants embrace three classes: the creoles, who form the better class of native Cubans; the negroes, who are descended from slaves imported from Africa; and the native Spaniards, numbering about 30,000.

Education has done little for the mass of the people, of whom about 70 per cent are illiterate. Under Spanish rule the Roman Catholic was the only recognized religion in the island.

Cities. *Havana*, with a population of about 200,000, is the capital and largest city. Situated on a broad harbor of the same name, it is picturesque by location, and by its fine public buildings, pleasure grounds, and parks. Most of the foreign trade of the island passes through this port.

Santiago, in the southeastern part of the island, is the second city in size and importance. It has a population of about 60,000, and is the center of trade for the neighboring iron and copper mines.

Other important towns are *Matanzas*, on the north coast; *Pinar del Rio*, in the western part; *Puerto Principe* and *Cienfuegos*, in the central part; and *Holguin* and *Manzanillo*, in the eastern part.

PUERTO RICO.

Physical Features. Puerto Rico is the smallest of the four large islands—Cuba, Haiti, Jamaica, and Puerto Rico—which together are called the Greater Antilles. The most eastern of the group, this island is 1350 miles in direct line from New York. Its area is 3531 square miles, or about one twelfth that of Cuba.

Its average length is 95 miles; its breadth, 35 miles.

The mountain range traversing the island east and west is little more than a range of hills, the highest peak of which is about 3600 feet high. From these hills, covered with vegetation, more than 1200 streams flow north and south into the sea. Many of them, especially in the north, are rivers of considerable size.

The Climate is tropical, but more healthful than that of Cuba. The average temperature during the summer months is 83°; during the winter months, 76°. The average rainfall is



Express wagon, Cuba.

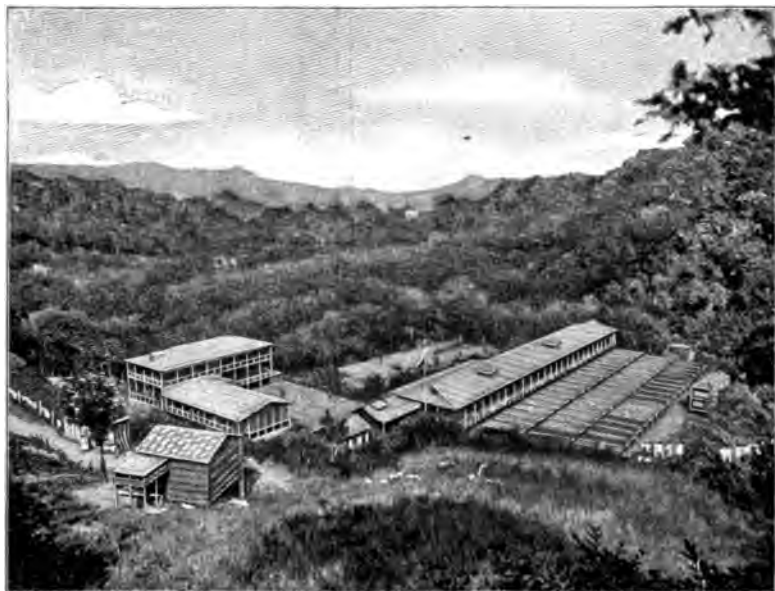
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The hills may be cultivated to their very tops. Bananas are the most common and profitable product. Oranges, limes, coconuts, and pineapples also grow in great abundance.

Coffee is a leading product, the trees thriving best on the hillsides at an elevation of a thousand feet or more. More than 34,000,000 pounds of coffee are produced annually. Sugar cane is grown on the uplands, yielding about 140,000,000 pounds of sugar annually. The lowlands produce tobacco to the extent of 7,000,000 pounds a year. Rice is cultivated on the hillsides, and is the main food of the laboring classes. Indian corn is native to the island.

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A garden in Ponce, Puerto Rico.

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The island was afterwards slowly colonized by Spanish immigrants, who were compelled, from time to time, to defend themselves against the English and the Dutch. In 1870 Puerto Rico was organized as a province with seven departments. Slavery had existed from the first settlement, but was abolished in 1873. After the Spanish-American war of 1898, the island was ceded by Spain to the United States.

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THE HAWAIIAN ISLANDS.

Physical Features. The Hawaiian Islands lie in the Pacific Ocean, about 2500 miles southwest of San Francisco. The is-

lands of this group are eight in number, and the chain extends in an irregular line from northwest to southeast, between about 18° and 23° north latitude. The area of the seven in-

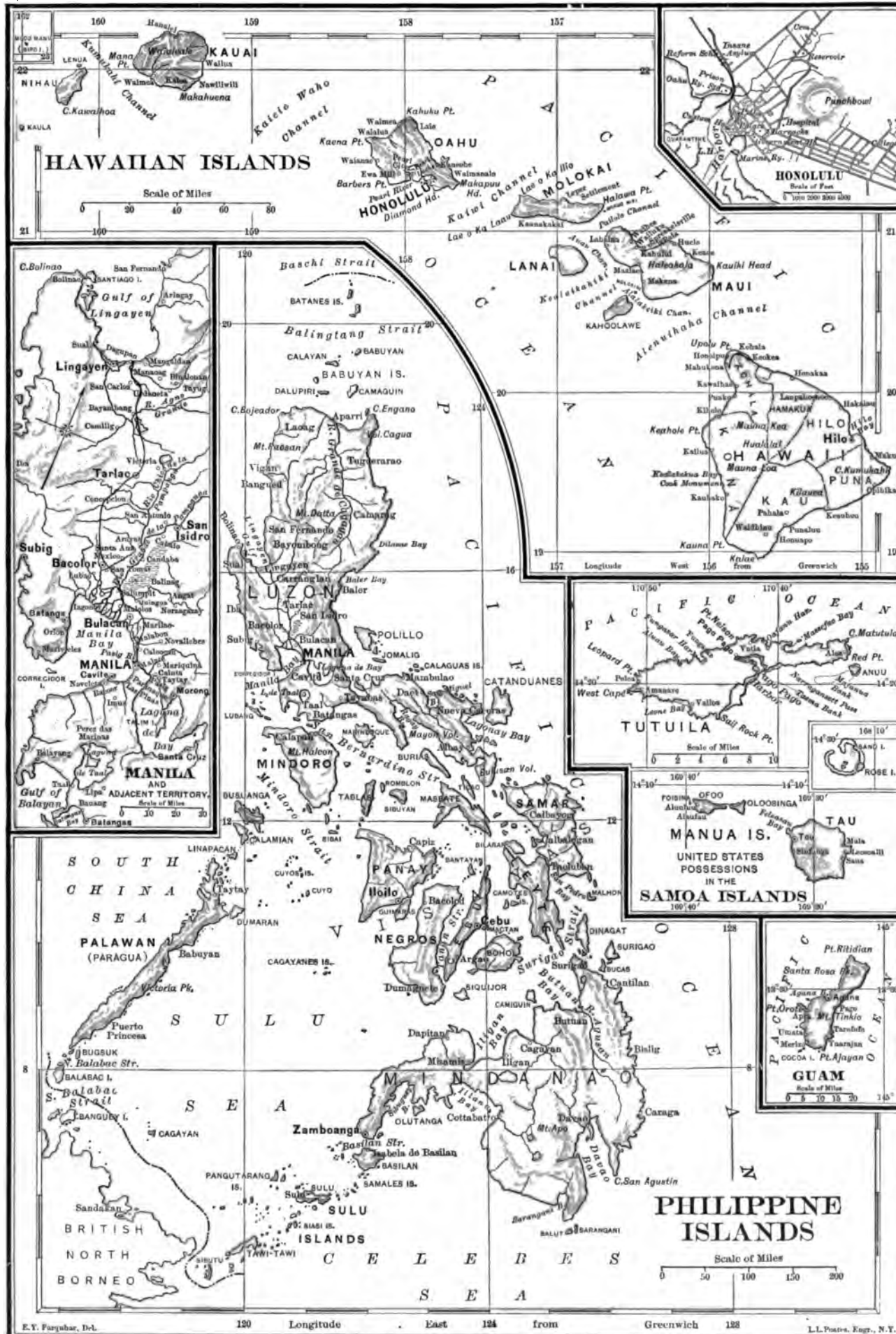
habited islands is 6545 square miles, or about two thirds that of the state of Vermont. The largest island, Hawaii, is twice the size of Delaware; Oahu is half as large as the state of Rhode Island.

The whole chain consists of a series of volcanoes, all now extinct, except Mauna Loa and Kilauea, in the island of Hawaii. Mauna Kea, in the same island, has an altitude of 13,805 feet. The mountainous surface of the islands is everywhere broken by valleys and running streams, but there are no rivers.

Of mineral products there are none except those which occur in volcanic regions, such as sulphur, copperas, and niter.

The Climate is warm, the air is pure and agreeable, being refreshed by the north-east trade winds, and the temperature, seldom rising above 88°, is made equable by the vast surrounding ocean. The average yearly rainfall is about 50 inches, although in the island of Hawaii it reaches 200 inches.

Vegetation and Animals. The windward mountain slopes and valleys are covered with a dense tropical growth, and the forests contain much valuable timber. The more useful indigenous trees and plants include the screw pine, the cocoanut, the candlenut, used for lighting, the breadfruit, the banana, and the wonderfully nutritive taro, the principal food plant of the natives.



Pigs, dogs, and rats are found, but have been introduced by man. There are snipes, plovers, ducks, and a few singing birds. Imported goats and cattle have increased into wild herds. The only reptile is a small lizard.

Industries. As yet there is no extensive manufacturing, and agriculture is the main occupation. Sugar cane is the most im-



Hauling sugar cane to mill,
Oahu, Hawaiian Is.

portant crop, and sugar making is the leading industry. Coffee, which grows on the elevated lands, is the next important product, and is rapidly increasing in importance. Rice is raised on marshy fields by Chinamen.

The common garden vegetables, peaches, oranges, pineapples, bananas, the guava for jelly—all produce abundantly. The tea plant, and the ramie and the tree-fern pulu, both yielding a fine fiber for weaving and for cushions, have been successfully introduced. There are large sheep farms, and the wild cattle are killed for their hides.

The Hawaiian Islands are of great commercial importance to the United States, and Honolulu is in direct line of vessels plying between the Pacific coast and China, Japan, and Australia.

History. The Hawaiian Islands were discovered by Captain Cook in 1778, and by him were named Sandwich Islands, in honor of the English earl of that name. Cook and the natives were on friendly terms until he unintentionally offended against their religious customs, when they killed him, in 1779. In 1820 American missionaries began their labors in Oahu, and to them is largely due the rapid advance in civilizing the islands, and in promoting education.

The islands were governed by chiefs and monarchs until 1893, when the queen was deposed, and the group was formed into a republic. In July, 1898, the Hawaiian republic was annexed to the United States.

The People, according to the latest census of the islands, number 109,020. Of this total about 25,000 are Japanese; 20,000 Chinese; 15,000 Portuguese; 2000 British; and over 3000 Americans, who are the ruling class.

The natives, called Kanakas, are gentle, intelligent, and brave, but, owing to the radical change in their customs, they are rapidly decreasing in number.

Cities and Towns. *Honolulu*, the capital, having a population of about 30,000, is situated on a plain on the south coast of Oahu. The harbor is more than a mile long, and admits the largest vessels. The city contains substantial government buildings, churches, and handsome residences; also several planing mills, rice mills, and iron works.

Hilo has about 12,000 inhabitants, is beautifully situated on the island of Hawaii, and is next to Honolulu in importance. On the west side of the same island is *Kauahalo*, near the place where Captain Cook was killed, and where a monument stands to his memory. On Maui, the most important town is *Lahaina*; and *Wailuku*, *Kahului*, and *Spreckelsville* are flourishing villages.

THE PHILIPPINE ISLANDS.

Physical Features. The Philippines are east of Indo-China, and about 600 miles southeast of China, from which they are separated by the China Sea. The most northern point in the group is in about the latitude of southern Cuba, and the most southern point is only $5\frac{1}{2}^{\circ}$ from the equator. The length of the archipelago is 1000 miles; the greatest width 640 miles. The land area is about 115,000 square miles.

Various estimates have placed the number of these closely packed islands at from 480 to 2000. Luzon and Mindanao include more than half the area of the whole group. The surface is generally broken by mountains of volcanic origin. There are many water courses, the largest rivers being the Rio Grande in Luzon and the Rio Agusan in Mindanao. Each of these two rivers is over 200 miles long.

The Climate is purely tropical, and there are three seasons: the

cold, with a temperature of 77° to 80° , and extending from November to March; the hot, from March to July, reaching a temperature of 100° ; and the wet, from July to November, during which period torrents of rain fall. Violent hurricanes, or typhoons, visit the northern islands.

The Mineral Resources have been but little developed. In Luzon are granite, limestone, and marl. Coal has been found in Luzon, Cebu, and Negros. Copper is abundant in Luzon, where also is excellent iron ore. Gold, lead, mercury, and sulphur have been discovered.

The Forests contain a variety of valuable trees, among which are cedar, ebony, ironwood, logwood, and teak. The cocoanut palm is everywhere, and bamboos, rattans, mangoes, jackfruit, and all Malayan fruits grow in abundance.

Agriculture is the prevailing pursuit, and its chief products are sugar cane, coffee, and the famous Manila hemp, a fiber obtained from a species of banana. The finest sugar is produced in Panay; and the total yearly export of sugar is 250,000 tons.

Coffee grows in all the islands, and rice is the common food of the natives. The cacao bean, brought from Mexico, and Indian corn, introduced from America, with cotton, pepper, ginger, and vanilla, are other products of importance.

The Wild Animals include the white monkey, deer, wild cat, alligator, turtle, boa, python, and various kinds of snakes, of which only one is poisonous. Of birds there are 200 species, and there



Oahu College building, Hawaiian Is.



The buffalo is the beast of all work.

are numerous beautiful butterflies and destructive ants. The wild buffalo is tamed and is the beast of all work. Small horses, cattle, and sheep, derived from Europe, and goats, are raised in large herds and flocks.

Manufacturing by machinery has never been developed, but handicraft is carried on by the natives with skill and art. They weave cotton, and from the silken fiber of the piña plant make the most delicate lace. In Manila women are employed in making hats, mats, cigars, and cigar cases.

Commerce within the islands has suffered from the want of roads, and there is but one railroad—that in Luzon, 123 miles long. Foreign commerce centers in the main ports where export products are gathered, Manila ranking first.

History. The discovery of the Philippines is due to Magellan, who on the first voyage by white men across the Pacific, in 1521, landed at Cebu. Here he joined the friendly ruler in an attack upon his enemies, and was killed.

For nearly 400 years the Philippines were subject to Spain. Growing discontent under the tyranny and oppressive taxation of Spanish rule incited the more civilized natives to insurrection, which broke out in 1896. During the war between Spain and the United States, in 1898, Admiral Dewey destroyed the Spanish fleet in Manila Bay, and upon the conclusion of the war the entire group of islands was ceded to the United States.

People. The largest part of the population is of Malay descent, embracing the Tagals of Luzon and the Visayans occupying several islands south of Luzon. Both of these classes adhere to the Roman Catholic Church. Another class of Malays is the piratical Moros, who are Mohammedans. A small number of woolly-haired negritos, descended from the original inhabitants; very many distinct and nearly savage tribes inhabiting different is-

lands; over 30,000 Chinese, with numerous mestizos; and about 20,000 pure Spanish, mostly in Manila—all together make up a population estimated at 7,000,000. The number of dialects spoken is said to be about 500.

Cities. *Manila*, the capital, is a walled city of 150,000 inhabitants, situated on a large bay of the same name. It is the main port for foreign commerce, and has many modern improvements, including paved streets and electric lights. *Cavité*, 15 miles from Manila, is a naval and military station. *Iloilo*, in the island of Panay, is the second city of importance, and has a large trade in sugar. *Cebu*, capital of the island Cebu, is a well-built city of 35,000 people. Several other cities and towns have populations ranging from 1000 to 20,000 each.

GUAM is the largest and most populous of the Ladrões, discovered by Magellan on his famous voyage, and so named on account of the thieving habits of the natives (*ladrones* is Spanish for "thieves"). These natives, enslaved and oppressed by the Spaniards, were finally exterminated, and were succeeded by immigrants from Mexico and the Philippines. Guam is important only as a naval and coaling station.

WAKE ISLAND is an atoll in the North Pacific Ocean, between Guam and the Hawaiian Islands. It has no inhabitants, and was seized by the United States in 1899 for a coaling station and cable landing.

TUTUILA is one of the three largest of a group known as the Samoan or Navigator Islands, lying about 14° south of the equator and nearly 3000 miles east of northern Australia. The inhabitants are a well-built, straight-haired race, remarkable for strength, bravery, and intelligence. For several years the Samoan Islands were governed by their own king, under the joint control of Great Britain, Germany, and the United States. By a recent treaty Great Britain relinquished her claim, and Tutuila was ceded to the United States. The island is 18 miles long, 6 miles wide, and is valuable only as a naval coaling station.



Street scene in Manila.

PRONUNCIATION OF NAMES.

Aguadilla, ä-wä-thél'yä
Antilles, än-tíl'léz
Arecibo, ä-rä-sé'bō
Arroyo, är-ro'yō
Cavité, kä-vo-tä'
Cebu, thä-bü'
Cienfuegos, sé-än-fwä'gōs
Culebra, kü-lä'brä
Fajardo, fä-här'dō
Guam, gwäm
Guayanilla, gwä-ä-nél'yä
Havana, hä-vän'ä
Hawaii, hä-wi'ë
Hilo, hē'lō

Holguin, hōl-gēn'
Honolulu, hō-nō-lū'ly
Iloilo, ä-lō-ä'lō
Juana, hwä'nä
Kahului, kä-hü-lü'ë
Kauhako, kou-hä'kō
Kilauea, kē-lou-ä'ä
Ladrões, lä-drōnz'
Lahaina, lä-hi'nä
Luzon, lü-zōn'
Manila, mä-nē'lä
Manzanillo, män-sä-nél'yō
Matanzas, mä-tän'zäs
Maui, mou'ë

Mauna Kea, mou'nä kä'ä
Mauna Loa, mou'nä lö'ä
Mayaguez, mi-ä-hwēs'
Mindanao, mēn-dlä-nä'ō
Mona, mö'nä
Moro, mö'rō
Negrito, ne-grī'to
Negros, nä'grōs
Oahu, ö-ä'hü
Panay, pä-ni'
Philippines, fl'lp-lnz
Pinar del Rio, pē-när' dēl rē'ō
Ponce, pōn'thä
Puerto Principe, pwēr'tō prēn'sē-pä

Puerto Rico, pwēr'tō rē'ēō
Rio Agusan, rē'ō ä-gy sän'
Rio Grande, rē'ō grän'dä
Samoa, sä-mō'ä
San Juan, sän hū-än'
Santa Clara, sän'tä klä'rä
Santiago, sän-tē-ä'gō
Sierra de los Organos, sē-ēr'rä dē löp
ör-gä'nōs
Tagal, tä-gäl'
Tutuila, tü-tü-e'lä
Vieques, vī-ä'käs
Visayan, vī-si'an
Wailuku, wi-lü'kü

NATURAL ADVANCED GEOGRAPHY.

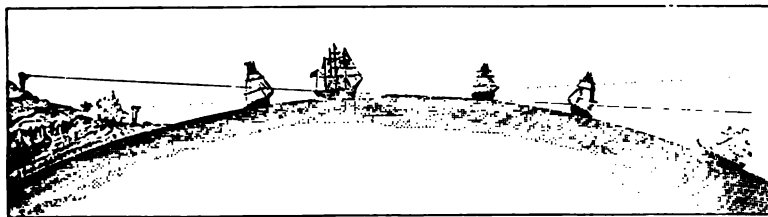
THE EARTH AS A WHOLE.



THE EARTH.

FORM AND SIZE.

Long ago people believed the earth to be flat, but there are several ways by which we know that its surface is



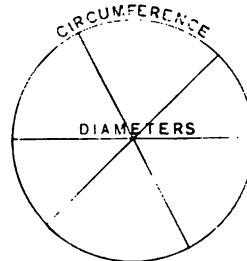
curved: (1) when a ship sails away from us, we can see the sails and the tops of the masts long after the lower part of the ship is hidden from view; (2) people have traveled in one general direction entirely around the earth to the place from which they started; (3) when the earth passes between the sun and the moon, the earth's shadow, which falls on the moon and darkens, or *eclipses*, it, is seen to be always round. As a sphere is the only body whose shadow is always round, we know that the earth is spherical.



The earth is not a perfect sphere. It is slightly flattened on two opposite sides, so that its shape is somewhat like that of an orange. A body with such a shape is called a *spheroid*. The earth is so slightly flattened, however, that we may think of it as a perfect sphere.

The *diameter* of the earth, or the distance through its center from side to side, is about 8000 miles. The *circumference* of a sphere, or the greatest distance around it, is about 34 times its diameter. About how many miles are there in the circumference of the earth?

We are likely to wonder why the people and loose objects do not slide off from the round earth or drop away from the other side of it. If you raise a stone from the ground and then let go of it, what happens to the stone? If a man who lives on the opposite side of the earth lifts a stone and then lets go of it, which way do you suppose the stone falls? On every part of the earth's surface heavy bodies if unsupported fall *toward* the ground. The earth has the power of pulling objects toward itself, and the pull is so strong that it keeps loose bodies close to the earth's surface. This wonderful power is called *gravity*.



Tests. How do we know that the earth's surface is curved? How do we know that the shape of the earth is spherical? What is a spheroid? Define diameter; circumference.

What is the size of the earth? What is gravity? Of what use is it?

Optional Supplementary Work. For what is Magellan famous? A fast steamship sails about 500 miles a day; how long would it take to sail the greatest distance around the earth?

ROTATION.

The earth is always *rotating*, or spinning, slowly upon its shortest diameter, or *axis*. The rotation of the earth is important to us in several ways.

Day and Night. The sun and most of the stars are so hot that they send out light as a piece of white-hot iron does. The surfaces of the moon and the earth are so cool that, like a piece of cold iron, they give out no light of their own. The stars are so far away that they give us very little light. It is only the sun-lighted part of the moon that appears bright. From what does the earth get most of its light? About how much of the earth is lighted at one time?



What causes day and night to follow each other?

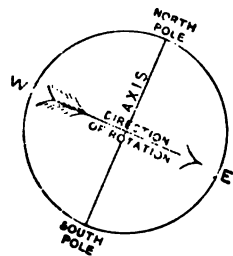
The line between the light half and the dark half of the earth may be called the *sunrise and sunset line*, because it is when places are carried by rotation across this line that the sun appears to rise or to set.

Time. The speed at which the earth rotates never varies; hence the earth always occupies the same amount of time in making a complete rotation. This amount of time is called a *day*,* and for convenience it has been divided into twenty-four equal parts called *hours*, which are subdivided into equal parts.

Clocks are simply machines to indicate the speed of the earth's rotation in such a way that we may easily determine these subdivisions of time. In ordinary clocks the hour hand is made to move twice around the dial while the earth is turning once upon its axis.



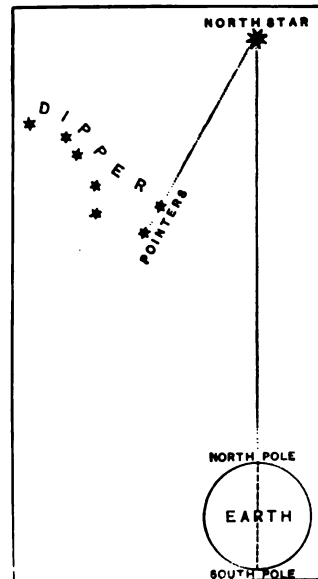
Direction. The earth always rotates in the same direction. This direction is called *east*, from an old word meaning "dawn" or "morning." As the earth turns eastward the sun appears to move across the sky in the opposite direction, which is called *west*, from an old word meaning "evening." Why are these names appropriate? *North* is the direction on the earth's surface from any place to the end of the earth's axis called the *north pole*, while *south* is the direction to the other end of the axis, called the *south pole*. If you stand facing east your left side is toward the north pole, and your right side toward the south pole. What direction is called northeast? What direction, northwest? Define some other intermediate directions.



The earth moves so slowly that it is hard to tell at once which way it is turning, but there are several easy ways to find north, south, east, or west, and when one direction is known the others may be found.

* The exact time required for one complete rotation of the earth is a *sidereal day*, and is measured by timing the return of a star to the same position on successive nights. There are $366\frac{1}{4}$ sidereal days in a year. In ordinary affairs of life we use the *mean solar day*, which is the average time occupied by the sun in returning to the same position over the earth on successive days. The mean solar day is about four minutes longer than the sidereal day, and includes a little more than one complete rotation of the earth. There are but $365\frac{1}{4}$ mean solar days in a year.

(1) About the 21st of March and the 21st of September the sun rises exactly in the east, and sets exactly in the west. Observe from your home the precise directions in which the sun rises and sets during the third week in September. During our summer months the sun is exactly in the east shortly after rising, and exactly in the west shortly before setting. During our winter months the sun rises south of east, and sets south of west.



(2) In our part of the world the sun is never exactly overhead; that is, in the *zenith*. When highest in the sky it is always due south of the zenith; hence in our country shadows cast by the sun at noon point exactly north. Observe this at noon to-day or to-morrow.

(3) One star is nearly in line with the earth's axis, and would appear directly overhead to a person at the north pole. It is called the Pole Star or the North Star. In our country it may be found any clear night by the aid of the two stars called "the pointers" in the group of seven stars called the Dipper. Try to find the North Star to-night. The direction along the earth's surface toward this star is north.

(4) The directions may be found very closely at any time by means of the *compass*. This is a little bar of magnetized steel, called the magnetic



Engineer's compass.



Mariner's compass.

needle, balanced on a pivot so that it can swing freely. When the needle comes to rest it always points to a place near the north pole.

Tests. Define axis; poles; rotation. Explain day and night. Define a day; its divisions. How is a clock related to rotation? Name and define the chief directions. Give four ways of finding them.

Supplemental Work. Illustrate the succession of day and night by means of a ball and a candle. If your house fronts south, are the sunny rooms at the front or at the back? Why?

ROTATION, Concluded.

Try to describe the position of the cross on the left-hand sphere below so that a person can locate a cross in exactly the same position on the



other sphere. Since a sphere is equally curved in all directions, and has no corner or edge from which to measure in locating points on its surface, it would be very hard to describe the location of points on the spherical earth, were it not for the earth's rotation.

Location. The turning of the earth gives to it an axis, and the ends of the axis, or poles, afford two fixed points from which we may locate any other place on the surface. We imagine an east and west line drawn around the earth halfway between the poles. This line is called the *equator*, because it divides the earth's surface into equal parts—a northern and a southern half, or *hemisphere*.

To locate a place in a north and south direction, we indicate its distance north or south of the equator. This distance is called *latitude*. Places north of the equator are in north latitude; those south of the equator, in south latitude. All places on the same side of the equator and at the same distance from it are in the same latitude. A line connecting such places is parallel with the equator, and so such a line is called a *parallel of latitude*. Any number of such parallels may be drawn. The dotted lines in the diagram represent parallels.

At all places on the same north and south line noon occurs at the same instant. A north and south line extending from the north pole to the south pole may therefore be called a mid-day line, or *meridian*. We may imagine a meridian to pass through any place on the earth's surface. The meridian which passes through Greenwich, a part of London, is called the *prime meridian*.

A place is located in an east and west direction by indicating the distance of its meridian east or west of the prime meridian. This distance is called the *longitude* of the place. The dotted lines in the diagram represent several meridians.

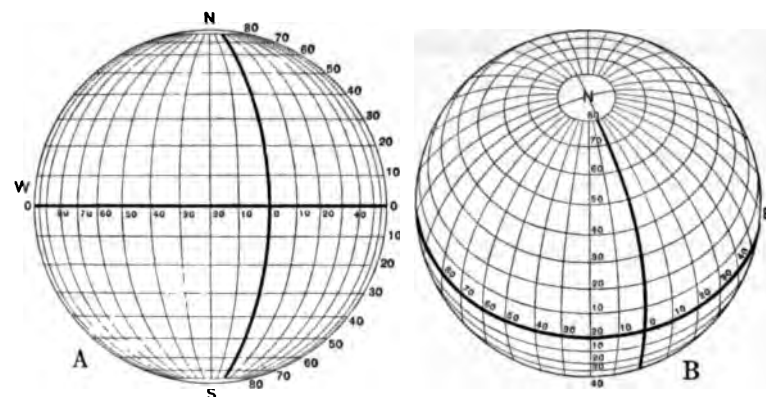
Thus we can describe the exact location of any place on the earth's surface by stating its latitude and longitude; that is, its distance north or south of the equator, and its distance east or west of the prime meridian.

How Latitude and Longitude are measured. The equator and the parallels extend entirely around the earth, and are circles; the meridians, which extend from one pole to the other, are called half circles. We therefore use *circular measure* in reckoning latitude and longitude. In circular measure a complete circle is divided into 360 equal parts, called *degrees* ($^{\circ}$). How many degrees are there in the equator? How many degrees in each parallel? How many degrees in each meridian? How many degrees distant from the equator is the north pole? The south pole?

As latitude is measured north and south from the equator, degrees of latitude are numbered from the equator to the poles. Thus a place north of the equator and distant one degree from it is said to be in lati-

tude one degree north, and a place south of the equator and distant 10° from it is in latitude 10° south.

Put your pencil on the parallel of 10° south latitude in figure A. In what latitude is the north pole? What is the latitude of a place whose distance from the equator is one third the way from the equator to the



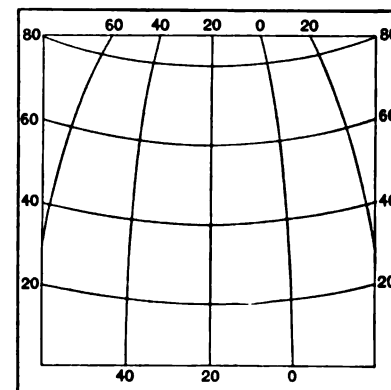
pole? What is the latitude of a place halfway from the equator to the north pole? Put your pencil on the parallel of 30° N. Lat.; 20° S. Lat. Show where the parallel of 45° N. Lat. should be drawn.

In figure B the north pole is represented as tilted toward the observer, so that the whole of several parallels near the pole are brought into view, and we can see that they represent circles. On this figure put your pencil on the parallel of 80° N. Lat. Follow this parallel through its entire length. What is the highest latitude that a place can have?

As longitude is measured east and west from the prime meridian, degrees of longitude are numbered east and west from that meridian, halfway around the earth. How many degrees are there in half the distance around the earth? Hence the meridian of 180° east longitude is the same as the meridian of 180° west longitude. How far around the earth is it from the prime meridian?

In what longitude is a place that is one fourth the way round the earth west from the prime meridian? Put your pencil on the meridian of 90° west longitude; 30° east longitude. Locate a point in Lat. 20° N. and Long. 40° W. Locate another in 35° N. and 65° W.

Several parallels are usually drawn on maps, sometimes as straight lines, but generally as curved lines, as shown in this diagram, and the distance of each in degrees from the equator is marked on the side margins of the map. Several meridians are also usually drawn on maps, and the distance of each in degrees east or west of the prime meridian is marked on the top and bottom margins of the map.

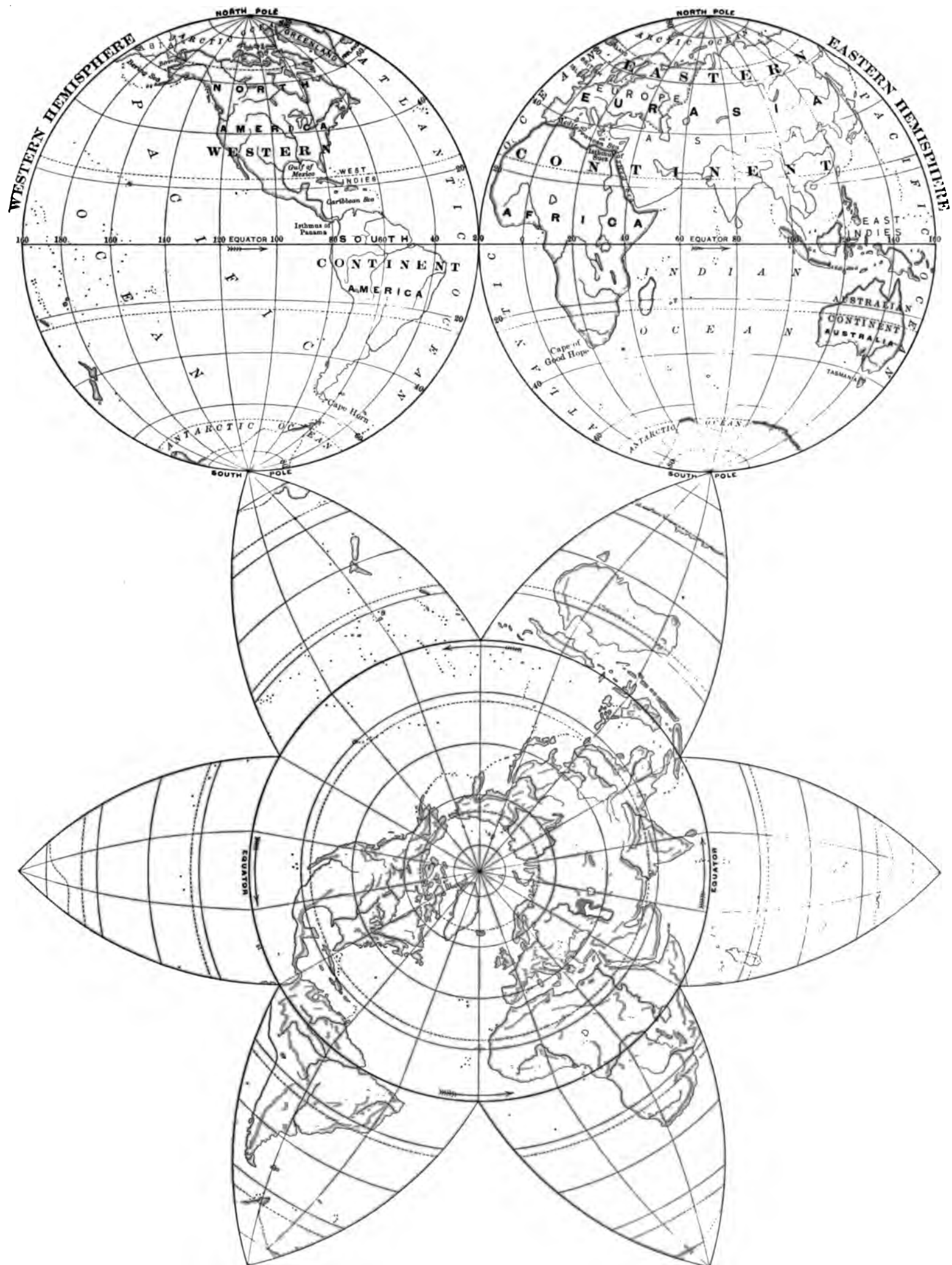


Tests. What is the equator? How does its location depend upon rotation? What is a hemisphere? What are parallels? Meridians? What is latitude? Longitude? How are they measured?

Supplemental Work. On a clay ball draw the equator, parallels, and meridians. Through how many degrees does rotation carry each meridian in an hour? When it is noon on any meridian, what time is it on the meridian fifteen degrees to the east? Thirty degrees to the west? One degree to the east? When it is noon on any meridian, in which direction, and how many degrees distant, is the meridian on which it is 6 A. M.? 3 P. M.? 3 A. M.? 12.20 P. M.?

TOPICS FOR ORAL OR WRITTEN REVIEW ON THE EARTH.

- I. FORM. Apparent; real.
- II. SIZE. Definition and length of diameter; of circumference.
- III. GRAVITY. Facts about it; use.
- IV. ROTATION. Four things depending on it; explanation of each.



THE UPHEAVAL OF THE LAND.

THE SURFACE OF THE EARTH.

The surface of the earth is not perfectly smooth and evenly curved. Some parts bulge out slightly, forming *regions of elevation*, while other parts are slightly sunken, forming *regions of depression*. The regions of depression are completely filled and covered to a great depth with salt water which forms the *sea*, while parts of the regions of elevation protrude above the surface of the sea and form the *land*.

Maps of the Hemispheres. Each of the maps at the top of the opposite page shows one half of the earth, or a hemisphere. The blue color represents the sea and the other colors represent the land. Is there more sea or land on the earth's surface? From the table on p. 157 estimate the proportion of each. Most of the land in the world lies in three great continuous masses, or *continents*; the remainder consists of many small masses, or *islands*. Because one of the continents was discovered by sailing westward, it is called the Western Continent, and the side of the world on which it is situated is called the *western hemisphere*. The opposite side of the world, or the *eastern hemisphere*, contains two continents. The larger is called the Eastern Continent. What is the name of the smaller?

Name the two *grand divisions* of the Western Continent. By what *isthmus*, or narrow neck of land, are they connected? What group of islands lies between these grand divisions? What large island is northeast of North America? What island near Greenland is partly in the eastern and partly in the western hemisphere?

The Eastern Continent, like the Western, is at one place nearly separated into two parts by arms of the sea. What isthmus connects these parts? What grand division is southwest of the Isthmus of Suez? The grand division to the northeast is Eurasia; but Europe, the western part of Eurasia, is usually considered as a grand division, and Asia, the eastern part, as another grand division. What islands are near the coast of Europe? A small part of Asia extends into the western hemisphere; by what *strait*, or narrow passage of water, is it separated from the Western Continent?

Australia, though really a continent, is sometimes called an island, and sometimes a grand division. What island group, or *archipelago*, lies between Asia and Australia?

In which grand division do we live? Examine the table on p. 157, and make a list of the grand divisions in the order of their size.

What is the name of the part of the sea surrounding the south polar region? From this broad expanse of sea great *oceans* extend northward between the continents. What ocean extends northward between America and Africa? Between Africa and Australia? Between Australia and America? Which of these oceans is largest? Which is narrowest? Name the branch of the Atlantic Ocean which surrounds the north pole. From the table on p. 157 make a list of the oceans in the order of their size.

Supplemental Work. Make a map containing an island, an isthmus, a strait, and an archipelago. Model these forms.

THE CONTINENTAL PLATEAU.

The Star-shaped Map. If we peel one half of an orange in gores, and then turn back the skin, as in the pictures to the right, we bring the skin of the whole orange into view. On the same principle a single map showing the surface of the whole round earth may be drawn as at the bottom of the opposite page.

The north pole is represented at the center of the map; hence *north* on this map is toward the center from all sides, and the direction of the earth's rotation, or *east*, is shown by the arrow points. The northern hemisphere is included in the largest continuous circle, which marks the equator, and the surface of the southern hemisphere is represented as divided into gores and turned up from below to form the six points.

In this map the blue tint represents the sea, and the land is colored green and buff.

Find the Arctic Ocean on the star map. What two grand divisions of land nearly surround the Arctic Ocean? With what ocean has the Arctic a broad connection? With what ocean is it connected by Bering Strait? What is a strait? Put your pencil on the islands Greenland, Iceland, and the British Isles. Find South America; the West Indies; Africa; Australia; the East Indies; the Indian Ocean.

Regions of Depression and of Elevation. In the part of the sea which is represented by the darker blue, the water is very deep, in some places more than five miles, but it has a general depth of about two and one half miles. This is the true region of depression on the earth's surface.

The lighter blue represents places where the sea is much shallower, the water being less than one mile deep. If the surface of the sea were to sink one mile lower than its present level, what would this light blue region become? How would this affect the number of continents? The parts of the sea colored dark blue would still have an average depth of one and one half miles. Thus not only the land surface but also the bottom of the shallower part of the sea (colored light blue on the map) may be considered as forming a single great region of elevation.

Continental Plateau. Any broad region of elevation may be called a *plateau*; and, as this great region of elevation contains all the continents, it is called the *continental plateau*. Besides the continents it embraces all the large and many of the small islands of the world; hence these islands are called *continental islands*. The continental plateau stretches across the northern hemisphere. In how many places does it extend into the southern hemisphere?

Near the north pole, and again between Eurasia and Australia, the water of the sea extends entirely across the continental plateau, forming great *continental seas*. Continental seas, as shown by the dark blue areas in them, are very deep in places, but their deep places are separated from the great depths of the oceans by the submerged edge of the continental plateau. What is the name of the northern sea? In the other sea, parts of the plateau are high enough to appear above the water and form a large group of islands. What is this group called? Find two places where the water extends *nearly* across the plateau, forming three continental seas and a deep gulf. Name them. What grand divisions do these bodies of water separate?

There is reason to believe that in past ages the surface of the continental plateau has been at times higher and at other times lower than it now is. Much of the present land was once so low that the water flowed over it, forming continental seas, and parts of the plateau now covered by water were once so elevated as to connect land masses now separate. Thus the Gulf of Mexico once extended much further north over the central part of North Amer-



ica; Australia and Asia are thought to have once been connected by land, which sank until now the islands of the East Indies alone remain above water; animals may once have walked from North America to Eurasia by land, where now the Arctic Ocean forms a water barrier.

Almost all the land in the world is embraced in the continental plateau; but there are many very small islands in the midst of the oceans and far from the shores of the continents. These are called *oceanic islands*. They have probably never been connected with the continental plateau. In which ocean are many oceanic islands?

TOPICS ON THE DISTRIBUTION OF LAND AND WATER.

- I. CONTINENTAL PLATEAU. Position. Continents. Continental seas.
- II. ISLANDS. Continental. Oceanic.
- III. THE SEA. Position. Depth. Oceans.

HIGHLANDS AND LOWLANDS.

The surface of the land slopes gradually upward from the sea and in a few places reaches heights of about five miles, but its general height is a little less than half a mile. All parts of the land below this average height may



A Norwegian fiord.

therefore be called *lowland*, while all higher parts may be called *highland*.

Upon the star map and other physical maps in this book the lowlands are colored green, and the highlands buff. Which side of the Western Continent is mostly highland? Which side is mostly a broad lowland? Toward which ocean is the highland side of the Western Continent? Toward which oceans are most of the highlands of the Eastern Continent? Which oceans are bordered by the broad lowland sides of both continents?

The Great Highlands. The high side of the continental plateau is the side toward the Pacific and Indian oceans. These highlands contain the highest and most rugged parts of the earth's surface. They are almost continuous, forming a great horseshoe-shaped curve from Cape Horn to Cape of Good Hope. Where are these capes?

Trace a route between these capes that shall lie on the highland as much as possible. At how many places must the route leave the highlands? Name these places. These low places divide the great curve of highlands into natural sections, one for each grand division of the land.

The Broad Lowlands. On the outside of the highland curve the slope is comparatively short and steep to the shores of the Pacific and Indian oceans. On the inside of the horseshoe, however, the slope is long and gradual to

the Atlantic and Arctic oceans. These oceans are thus bordered by broad lowlands, broken only by comparatively small and disconnected areas of highland, and even these, as a rule, are not very high. Point out some small disconnected highlands.

Is the Australian branch of the continental plateau high or low? About half of it is covered with water. What island group occupies this part? The highest side of this part is toward the Indian Ocean and forms an almost continuous chain of islands between Asia and Australia. Toward which ocean is the highest side in Australia itself? This rim is not very high, and most of the continent is lowland.

Tests. Define lowlands; highlands. Where are the great highlands of the continental plateau? The smaller areas of highland? Describe the two chief slopes of this plateau.

Supplemental Work. Model a plateau with a short, abrupt slope on one side, and a long, gentle slope on the other.

COASTS.

We have learned that during past ages the surface of the continental plateau has been at times higher and at other times lower than at present. But upward or downward movements of the earth's surface are not confined to the past; they are still taking place in most parts of the world, though so slowly that we seldom notice them. The movement may be only a few inches or a few feet in a hundred years.

In some regions old buildings which long ago stood on the coast and near the level of the sea are now several feet above sea level and some distance inland, showing that those regions have slowly risen above the sea. In other regions old buildings are now found partly covered by the sea. What does this show?

Sinking Coasts. The surface of the land is seldom exactly smooth or level. It is almost always broken by higher places, or *hills*, and intervening lower places, or *valleys*. Therefore, when a coast region is slowly sinking beneath the sea, long or wide arms of the sea



A promontory on the Maine coast.



Islands off the Maine coast.

gradually creep up the valleys, extending far into the land. They form *gulfs* or *bays* if they are wide, and *fiords* or *estuaries* if they are long and narrow. The higher parts of the coast are left projecting into the sea between the indentations as great masses or narrow fingers of land,

called *peninsulas*. The ends of some such peninsulas form high capes, or *promontories*. Some peninsulas are connected with the mainland only by a narrow neck of land. What is such a neck of land called? By the continued sinking of such a coast the water may at last overflow a low isthmus. Into what will this transform the higher parts of the peninsula?

Thus a sinking coast is very likely to be irregular, much broken by bays and peninsulas, and perhaps fringed with islands.

Rising Coasts. The bottom of the sea is much



Nearly level rock layers, Ausable, N.Y.

smoother and more nearly level than the surface of the land. It has long and gradual slopes, but very few short and steep slopes such as make ordinary hills and valleys. *Therefore, when the smooth sea bottom along the rising margin of a continent is brought above the surface of the sea, it usually makes a comparatively even and regular coast line.*

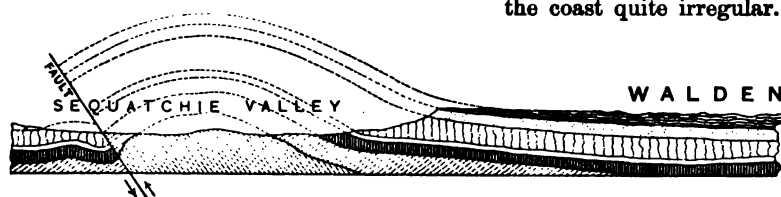
Which is more even and regular, the coast of America which borders the Atlantic and Arctic oceans, or that which borders the Pacific Ocean? (star map, p. 8.) The Arctic and the northern parts of the Atlantic Ocean coasts of both the Eastern and the Western Continent are very irregular, and are in general bordered by lowlands. Long stretches of these coasts are slowly sinking.

On the other hand, the Pacific coast of America is quite even and regular, and is closely bordered by highland. Much of this coast is being slowly upheaved.

The Pacific and Indian Ocean coasts of the Eastern Continent are more irregular than the Pacific coast of America, and are bordered in places by broader areas of lowland. It is probable that parts of these coasts are sinking, and that other parts are rising.

Tests. How do we know that portions of the earth's surface have varied in elevation? Explain the effect of sinking on a coast; the effect of rising.

Supplemental Work. Draw a map showing a gulf or bay, a peninsula, and a cape. Model in a pan, with clay or putty, an island having a regular coast line but an irregular surface. Show, by pouring water into the pan, how the sinking of the island would make the coast quite irregular.



Folded and broken or faulted rock layers, Tennessee.

UPHEAVAL OF MOUNTAINS.

Level Rock Layers. In many places the land has been raised so evenly that its rock layers have been but little disturbed and are still nearly level. *This is very likely to be the case in lowland regions.*



Folded rock layers, Maryland.

Rock Folds. In other places the layers have risen in long waves or folds, as though the region had been crowded into less width by enormous side pressure. Instead of being level, these layers of rock slant at all angles, or even stand on end. They are bent and broken across, and at the cracks, or *faults*, they have slid up or down or over each other, as shown at the bottom of the page. Such disturbance of the rocks is common in the highlands and is nearly always found in mountain regions, for *most mountains are nothing but the harder parts of these rock folds left projecting high above the surrounding country*; the softer parts having been gradually worn off and washed away by the rain and the streams.

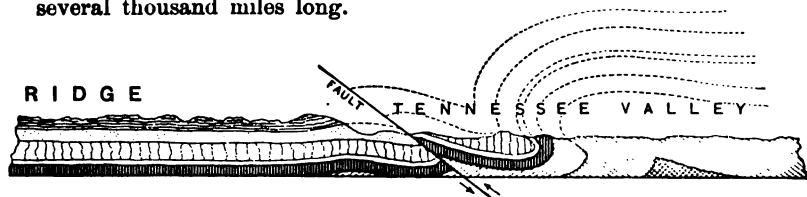
One fold, if its top has not been greatly worn and washed away, may make a single line, or *range*, of mountains, as in the picture above.



Illustrating parallel ridges formed by worn rock folds.

If the top of the fold has been worn away, the projecting layers of harder rocks in its two sides may form nearly parallel ranges of mountains. Point to the parallel ranges in this diagram; to the valleys between.

As a single fold may thus produce one or more ranges, and as there are often several folds side by side, mountains usually occur in roughly parallel ranges. The individual ridges may not be very long, but parallel ridges may continue, and thus a single region of folded rocks may produce a series of ranges, forming a great *mountain chain* or *system* several thousand miles long.





An active volcano: Mt. Vesuvius.

Earthquakes. The rising or the sinking of the land, and the folding and breaking and slipping of the rocks, have been going on for ages, a very little at a time. Each break or slip has caused a jar, or *earthquake*, which may have been felt for many miles around. Earthquakes are common in all parts of the world, but are most frequent in the great highlands and along the margin of the Pacific Ocean. *In these regions, therefore, it is thought that upheaval is now taking place most rapidly.*

Volcanoes. At many places in the world, steam and white-hot melted rock, or *lava*, occasionally issue out of the earth. Such places are called *volcanoes*.

Sometimes the lava issues quietly and flows in great streams over the surrounding country, where it cools into sheets of hard lava rock. Generally, however, there are terrific underground explosions of the steam, which hurl the melted lava high into the air, where it cools and falls over a wide region, as a rain of rocky fragments.

These explosions are generally so violent that they jar the whole region about the volcano, and hence explosive eruptions are frequently accompanied by earthquakes.

The lava which issues from the volcano generally accumulates around it into a great conelike hill or mountain, called a *volcanic cone*. Through this the throat, or *duct*, of the volcano leads to a cup-shaped opening, or *crater*, near the top.

An eruption of lava may last for weeks or months, and then years may pass before another eruption takes place. After perhaps centuries of such occasional activity, the eruptions of a volcano may cease entirely. The volcano is then said to be *extinct*.

Nobody knows what causes volcanoes, but they are supposed to be one of the results of the upheaval or the sinking of the earth's surface, the cause of which is likewise unknown. Lava from active or extinct volcanoes is found in nearly every mountain region where the rocks are greatly disturbed, and most of the *active* volcanoes occur near the Pacific margin of the continental plateau, where the rising of the earth's surface is supposed to be now going forward most rapidly. But volcanoes also

occur on the sea bottom, in the great region of depression, far from the continental plateau. Here they build up huge cones, whose tops mark the location of all oceanic islands.

Tests. What is a mountain; a range; a system? Explain earthquakes. Define volcano; its features. Where are many volcanoes?

Supplemental Work. Find out something about the Charleston earthquake of 1886. Read about the destruction of Pompeii in Baldwin's Readers, 5th year.



An extinct volcano: Mt. Shasta, California.

TOPICS ON EFFECTS OF UPHEAVAL.

I. CONTINENTAL PLATEAU. Continents. Grand divisions. Continental islands.

II. SURFACE MOVEMENTS. Speed. Results: on surface; on coast. Indications: volcanoes; earthquakes.

III. SURFACE FORMS. Great highlands: location; shape; divisions. Slopes: short; long. Broad lowlands: location; extent.

THE WEARING AWAY OF THE LAND.

THE ATMOSPHERIC AGENTS.

Erosion. As soon as any part of the sea bottom is raised above the water, it is exposed to the changes of the weather and the action of the winds; that is, to *atmospheric agents*. It is also exposed to the action of water in its various forms. These are constantly at work, slowly but surely, breaking up the solid rocks, and moving the material



A little volcano in California, showing an old outflow of lava which by damming a valley caused the formation of two lakes.

down the slopes of the land. This work of the atmospheric agents and of water is called *erosion*. It results in the gradual wearing away and lowering of the surface of the land.

Detritus. To a slight depth the surface of the land is warmed or cooled as the weather changes. With each change of temperature it expands or contracts very slightly, but with sufficient force to loosen grains from the exposed surface of the hardest rocks, and often to crack off larger fragments. Rain water slowly dissolves and carries away the cement which binds together the grains of many rocks. When rain water freezes in crevices of the rocks, it expands and pries off pieces of stone, which slowly crumble under the effects of heat and cold. Sand, blown by the wind against the rocks, wears their surface and finally may reduce them entirely to powder.



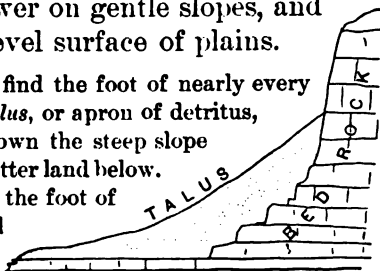
Rocks worn by wind-blown sand, Colorado.

By the operation of these processes of *weathering*, the surface of nearly all parts of the land is kept covered with a layer of *detritus* composed of the coarser or finer fragments of the solid rocks.

Near the surface, this layer of detritus is generally quite fine and is mixed with decaying animal and vegetable matter, forming *soil*. At greater depths the rock fragments are larger, while deeper still is the solid bed rock. In some places the detritus accumulates many feet deep. In other places it is removed by the rain and wind as fast as formed. In which of these places do you think the solid rock beneath the detritus will crumble away more quickly?

Movement of Detritus. Whenever disturbed, the soil particles move most readily *down* the sloping surface. Why? These tiny particles are almost always being slightly disturbed by such causes as the splash of rain drops; their own expansion and contraction as the weather makes them warmer or cooler; the expansion of freezing water in the soil; the action of the wind; worms, insects, or other animals; and the growth of roots beneath them. As a result, the detritus is very slowly but ceaselessly moving down the slopes of the land. The movement is fastest on steep slopes, slower on gentle slopes, and slowest of all on the nearly level surface of plains.

By reason of this movement we find the foot of nearly every cliff and steep hill covered with a *talus*, or apron of detritus, which has traveled more quickly down the steep slope above than it could travel over the flatter land below. It has therefore accumulated about the foot of the hill, flattening its lower slope and making it merge gradually into the plain.



Devils Lake, Rocky Mountains, showing talus slopes.

Winds. The winds are powerful agents, not only in wearing away the solid rocks, but in moving the detritus. What causes the clouds of dust which you sometimes see? What is dust? Strong winds may carry coarse sand and keep larger fragments rolling and tumbling along the ground. In this way both the moving fragments and the surface which they strike are worn away.

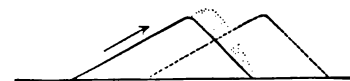
Are dust clouds more likely to rise from dry or from wet places? From bare regions, or from regions covered with vegetation? In dry or desert places and on sandy seashores an enormous amount of sand and fine rocky material is kept constantly in motion by the wind. Sometimes



Sand dune on the shore of Lake Michigan.

it is blown into dome-shaped hummocks or into great billows, and often into long ridges, or *dunes*, two or three hundred feet high.

The sand grains of such hills are blown up the slope exposed to the wind, and drop down on the sheltered slope; thus the hill gradually advances in the direction in which the wind blows. In regions where this movement of dunes has threatened the destruction of fertile farms, the advance is checked or stopped by planting the dunes with coarse grass or other vegetation. Why does this check the movement?



Illustrating movement of dunes.

Atmospheric Moisture. From every moist surface in the world, but mostly from the extensive surface of the sea, water is nearly always rising into the atmosphere in the form of invisible *vapor*. This process is called *evaporation*. The vapor, mingled with the air, is carried about by the winds, and thus much of that from the sea is brought over the land. The impurities in water are left behind when it evaporates; therefore, though sea water is salt, its vapor is fresh and pure.

When vapor-laden air is chilled, part of its invisible vapor condenses into minute drops of water, which can be seen. If it is chilled by coming into contact with cold vegetation, we may find the vegetation covered with *dew*. What is dew? When the vegetation is so cold that the vapor condenses into little ice crystals, we have *hoarfrost* instead of dew. If the vapor-laden air is chilled at some distance above the earth, countless tiny drops or ice crystals appear in the atmosphere, forming a *cloud*. What is a cloud called that hangs close to the earth? If the air about a cloud grows warmer, the tiny cloud drops or crystals may evaporate and disappear, but if it continues cool they may unite into larger drops and fall as *rain*, or into flakes which may fall to the earth as *snow*.

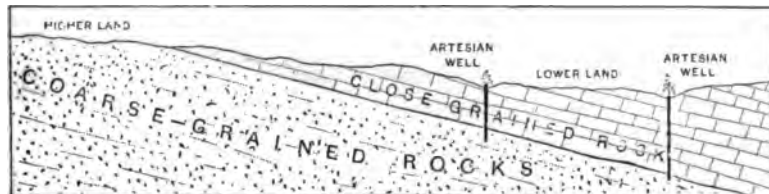
Tests. Define atmospheric agents; erosion; detritus; soil; talus; dunes. How is detritus formed? How are soil particles disturbed? How do dunes travel? Define vapor; evaporation; dew; hoarfrost; cloud; mist; rain; snow. How does evaporation affect the purity of water?

Supplemental Work. Observe at a road cutting or new-dug cellar the layers of rock, earth, and soil. Bring to school in a bottle a specimen of each placed in order. With colored crayons sketch the layers which you saw. Put a cold plate into the steam from boiling water and show that vapor condenses into drops when chilled. Boil some salt water. Condense some of the vapor. Taste the water thus obtained. Write an account of the experiment and tell what it proves.

GROUND WATER.

Much of the rain or snow water that reaches the earth sinks into the ground, penetrating not only the detritus but the solid rock beneath, often to a great depth. An enormous amount of water is thus contained in the ground. However dry the soil may be at the surface, it is usually kept moist at a slight depth by this ground water. It is the ground water that supplies all wells.

Springs. Part of the ground water from the higher lands creeps very slowly through the earth to the lower lands, where it may bubble forth at the surface as a *spring*. The distance which the ground water thus travels may be many miles, so that the journey may require weeks or months. If no rain or snow should fall on the higher lands, all springs would gradually decrease and finally dry up. Some surface springs do disappear in dry seasons, but the flow of deeper-seated springs is permanent, because the ground water creeps so slowly through the earth that the supply is not exhausted before rains or snows replenish it.



Illustrating artesian wells.

In this diagram the ground water from the higher land has completely filled the pores in the coarse-grained rocks beneath the neighboring lower lands, and yet no springs have been formed. This is because the slanting layers of close-grained rock or clay, which lie above the porous



Old Faithful Geyser, Wyoming.

rocks, prevent the ground water from rising to the surface. In such regions an artificial outlet to the porous rocks is sometimes opened by boring from the surface of the lower land through the close-grained rock. The pressure of the water in the porous rock then forces the water up the opening to the surface, thus forming an artificial spring, or *artesian well*.

In regions where the rocks are greatly disturbed, the ground water may follow some folded layer of porous rock to great depths, where it comes in contact with heated rocks, and it may then reach the surface as a *hot spring*. In some springs the water is so hot that, as it nears the surface and the weight of overlying water becomes less, part of it, at short intervals, flashes into steam, which throws the rest of the water high into the air, like a little water volcano. Such spouting hot springs are called *geysers*.

Work of Ground Water.

Ground water creeps along so slowly, and passes through such small pores in the rocks, that it can carry along with it very little detritus; hence spring or well water is generally clear and limpid, though it usually contains mineral matter which it has dissolved from the rocks through which it has passed.

Some spring water contains so much dissolved mineral matter that, though clear, it has the taste of salt, or of iron, or of sulphur. Such a spring is called a *mineral*



Hot spring deposits of basins and terraces, Wyoming.

spring. Hot water dissolves the rocks much more readily than cold, and consequently when the water of hot springs reaches the surface it contains much mineral matter.

While such waters cool, or as they evaporate, much of this mineral matter is deposited about the springs in the form of basins, terraces, icicle-like pendants, and other beautiful forms, which are often highly colored.



Stalactites and stalagmites, Luray Cavern, Va.

Limestone is easily dissolved, and in regions composed of such rock the underground waters often dissolve long channels and make great *caves* or *carvans* many miles in extent. Water in which lime is dissolved trickles through the roofs of these caverns, where part of it evaporates, while the rest drops down to the floor below and there evaporates. Does the water on evaporating carry with it the lime it contains? Thus there gradually grows downward from the roof, like an icicle, a *stalactite* of glistening lime crystals, while from the floor beneath a *stalagmite* gradually grows upward until they may meet and form a continuous column. Occasionally a part of the roof of a cavern breaks in, forming a *sink hole* in the land above. In time the entire roof falls in, transforming the cavern into an open gorge or valley; but over this a small part of the roof may remain for a time to form a *natural bridge*. A natural bridge may also be formed by the washing away of softer rock from beneath an outflow of hard lava.

Iron, gold, silver, copper, and other metals are dissolved from the rocks by ground water. One or more of them may be collected and deposited in a rock fault or fissure. Some of the richest mines in the world are in *veins* formed in this way.

Tests. Define and explain the formation of a spring; an artesian well; a mineral spring; a geyser; a vein; a cave; a natural bridge.

Supplemental Work. Find out about the geysers of Yellowstone Park, and about Mammoth Cave or Luray Cavern.

STREAMS AND LAKES.

Streams and Stream Basins. Nearly every spring is the beginning, or *source*, of a stream of water which flows from it. Water flows to the lowest place that it can reach, and therefore a stream usually flows along the bottom of a valley, the two sides of which slope downward toward the stream. As the stream advances it is generally increased in size by other streams, or *branches*, which flow into it from either slope of the valley.



The Mississippi river system.



Natural bridge, Yellowstone Park, Wyoming.

These branches may have their sources in springs, or in banks of melting snow; or they may flow only during wet weather, carrying the downfall of a passing shower to the more permanent, spring-fed streams.

By the flowing together of many streams as they advance down the sides of a great valley, there is formed, along the bottom of the trough, a mighty stream, or *river*, which, after a course of perhaps hundreds of miles, may finally reach the sea. A river with all its branches is called a *river system*, and the great valley drained by the system is called the *river basin*.

Lakes. If a stream meets a dam or barrier across its valley, it spreads out above the barrier, forming a *pond* or *lake* of still water. The *inlets*, or streams flowing into a lake, must raise its surface until the water can escape over the barrier before an *outlet* stream can flow from it down the valley below the dam.

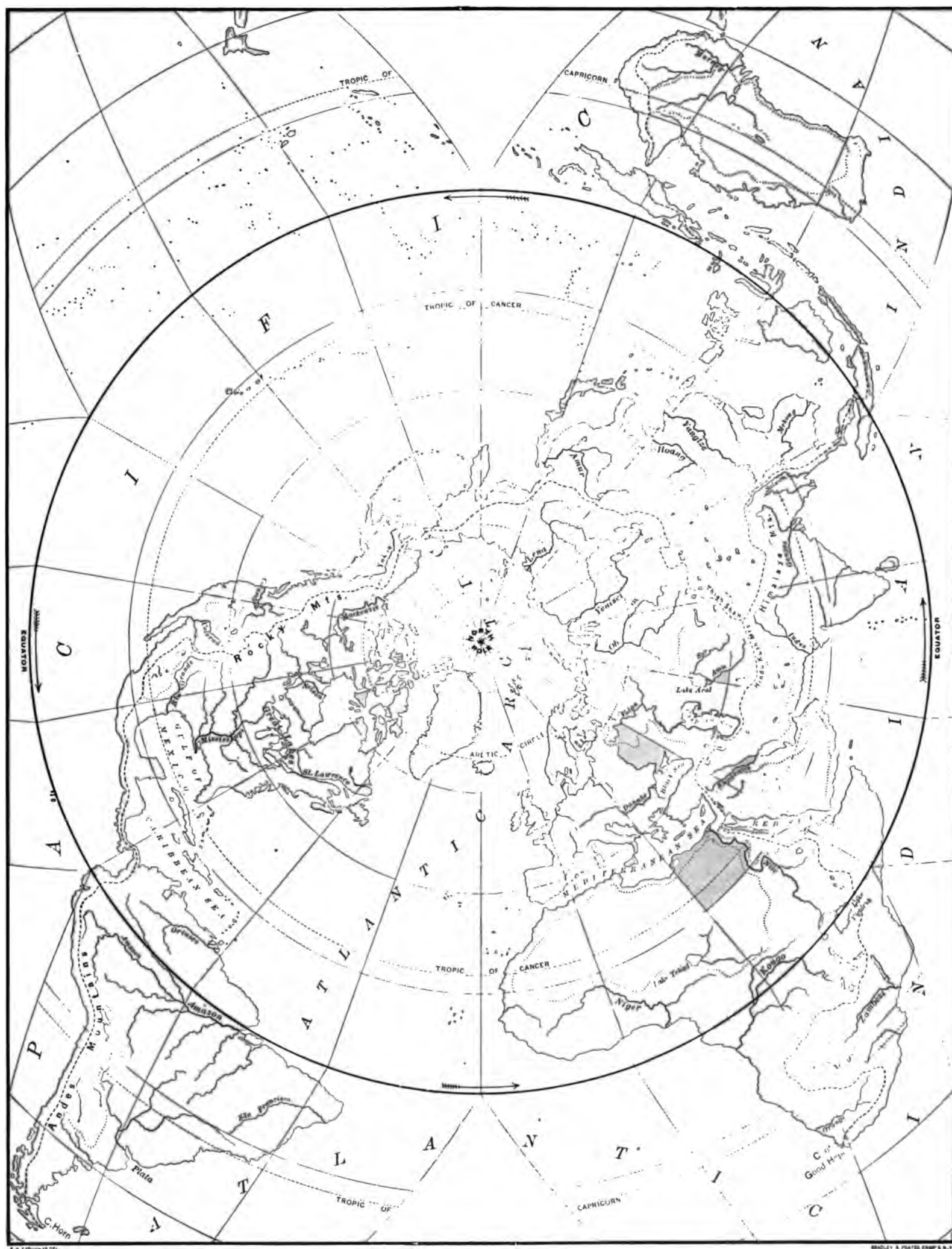
Water is almost always evaporating from the surface of a stream. When a stream widens to form a lake it loses much water by evaporation. In a dry region a lake, before its surface is raised high enough to form an outlet, may lose as much water by evaporation as is supplied by its inlets. Such a lake of course can have no outlet. In general, when we find a lake with no outlet we may know that the climate is very dry and evaporation very rapid. Why?

We have learned that spring water usually contains minerals which it has dissolved from the rocks. Salt is plentiful in the rocks and is very easily dissolved, and hence the water of spring-fed streams nearly always contains this mineral, though so little that we do not taste it. If a lake loses water by evaporation only, the salt and all the other minerals brought in by the inlets gradually accumulate until the lake water becomes very salt and bitter. Therefore, as a rule, *a lake that has no outlet is salt, while an outlet, by preventing much mineral matter from collecting in a lake, usually keeps its water fresh.*

Some rivers flow into a region where the atmosphere is so dry and evaporation so rapid that the rivers grow smaller and salty as they advance. They may finally disappear entirely, while a coating of salt is left on the dry beds by the last of the water that evaporates.

Tests. Define stream; source; branch; river; system; basin; lake; inlet; outlet. Explain the formation of salt lakes.

Supplemental Work. After a rain, find in a road or field a little system of streams; sketch it; and model its basin.



DIVIDES AND SLOPES.

Divides. Any region from which the land slopes downward in two opposite directions is called a water parting, or *divide*, because the water which falls on it is divided, part of it flowing down one slope and part down the other. The crest of every mountain range is a divide, and so too



is the crest of every imperceptible swell of land—from both the surface water flows in opposite directions. Every stream basin is partly surrounded by a divide, from which water flows down into the stream, and by which the basin is separated from adjoining basins.

Slopes. The streams which rise in the great highlands of the world (p. 10) flow down toward the Atlantic and Arctic oceans on one side, toward the Pacific Ocean on another side, and toward the Indian Ocean on the third side. The highland region may therefore be said to separate the continental plateau into three main slopes: (1) the *Arctic-Atlantic slope*; (2) the *Pacific slope*; (3) the *Indian Ocean slope*. The crest or meeting of any two of these slopes may be called a *continental divide*.

South America. Beginning with Cape Horn, trace the continental divide through South America. Which slope of the grand division is the larger? What four large river systems drain this slope? Why are there no large river systems on the *Pacific slope*? Do you find any lakes without outlets in this grand division? What do they indicate?

North America. Trace the continental divide through North America. Is the Arctic-Atlantic slope or the Pacific slope the larger? Name five great river systems on that slope. Name three on the Pacific slope. Why are these smaller than the systems on the other slope? Do you find any dry regions in the grand division? How can you tell them?

Eurasia. Trace the divide at the top of the Arctic-Atlantic slope of Eurasia. Trace the divide between its Pacific and Indian Ocean slopes. Which of these three slopes is the largest? Which contain the largest river systems? Name seven river systems on the Arctic-Atlantic slope; four on the Pacific; four on the Indian Ocean slope.

Salt Lakes of Eurasia. Do you find any lakes in Eurasia which have no outlet? Name three river systems which flow into such lakes. These are all large rivers, and the lakes which they form are the largest salt lakes in the world. Many years ago Lake Aral overflowed into the Caspian Sea, and the Caspian Sea was connected by a strait with the Black Sea and thus with the waters of the Atlantic. But a slow upheaval of the land raised a barrier between the Caspian and Black seas, and the climate is so dry that the Volga cannot raise the surface of the Caspian to the top of this barrier. How does the dry region of Eurasia compare in size with the dry regions of America?

Africa. Trace the continental divide through Africa. Which slope is the larger? Which contains the greater river systems? Name four river systems of the Atlantic slope; one system of the Indian Ocean slope. What large part of Africa is quite dry? This region is so dry that in crossing it the Nile River becomes smaller than it is nearer its source. Explain this.

Australia. Trace the continental divide through Australia. Which slope is the larger? What river system is on this slope? As a whole, is the continent moist or dry? Why do you think so?

After comparing the slopes of each of the grand divisions, state which of the three main slopes of the whole continental plateau is in your opinion the largest. Make a list of the large river systems on each of the main slopes of the continental plateau. How do they compare in number?

Supplemental Work. Draw a map of an island containing several river systems, and show by dotted lines the divides between them. Model two river systems with a low divide between them.

WORK OF STREAMS.

Valleys. Running water is constantly picking up particles of earth and carrying them downward in its current. In wet weather every stream is made more or less muddy by the load of detritus that is washed into it; but even in dry weather some particles are carried or rolled along by the current.

These particles, by striking against the sides and bottom of a stream, gradually wear them away, even if they are composed of the hardest rock; thus each stream is constantly cutting its valley *deeper*.

Meanwhile the sides of every valley are gradually weathering into detritus, which rolls or is washed down into the stream below and by it is carried away; thus the valley gradually grows *wider*.

These processes are very slow, but they are continuous and have been going on for untold ages. By them all the valleys in the world have been hollowed out or formed.



Illustrating the erosion of valleys.

Highland Valleys. A swift stream can carry more detritus and wear away its bed more rapidly than a stream with a gentle current. In highlands, where the slopes are steep, the streams are swift, and so the valleys are generally deep and narrow. In the western highlands of our country, where there is comparatively little rainfall, the valleys are deepened by the swift, snow-fed streams



Grand Canyon of the Colorado River, Arizona.

which flow in them from the mountains much faster than they are widened by weathering. Many of these valleys thus become unusually deep and narrow and have steep or precipitous sides. Such valleys are called *canyons*.

Lowland Valleys. In lowlands, where the slopes are usually gentle, the cutting power of streams is slight, so



A wide and comparatively shallow valley, New York.

the valleys may be widened by weathering faster than they are deepened by the streams. Hence, in lowland regions, the valleys are usually wide and comparatively shallow, with gently sloping sides. This is particularly the case in regions where there is abundant rainfall.

Peneplains. But even in dry highlands, as the canyons are cut deeper their bottoms approach nearer the level of the sea, and the slope, current, and cutting power of the streams in them become gradually less, until the further deepening of the canyon may proceed even more slowly than the slow weathering of its sides. Thus the canyons will grow wider and their sides less steep, until eventually all the highlands may be reduced to lowlands, with wide valleys and low intervening hills. By a continuation of the same processes these hills would be gradually worn away and the region finally reduced to an almost level surface, but slightly elevated above the sea, and called a *peneplain*.

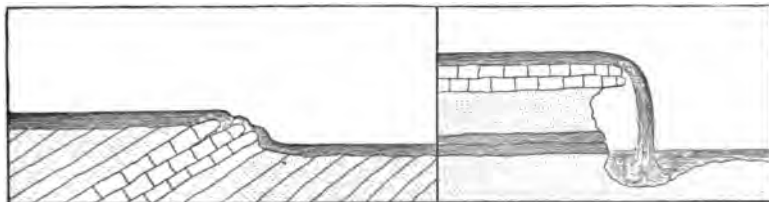
It is thought that some extensive regions in the eastern part of our country and elsewhere have been thus worn down to peneplains, or nearly so, and afterwards upheaved. It is certain that the whole land surface of the world would finally be thus reduced by the atmospheric agents, if there were not an unknown force within the earth by which the land is upheaved. Some regions are thus upheaved after they have been worn down, other regions are upheaved as fast as they are reduced, and still other regions are raised more rapidly than they are worn away.

Tests. How are valleys deepened; widened? How are canyons made; peneplains?

Supplemental Work. Draw a section of a highland valley. Of a lowland valley. If a stream flows east, and a north and south mountain range begins to rise across its course, under what circumstances will the stream change its course? Under what circumstances will it cut a canyon through the range? Make sketches showing the two cases.

STREAM FEATURES.

Rapids and Cataracts. In cutting down its bed a stream may encounter a very hard layer of rock, which retards



Illustrating rapids and cascades.

Illustrating cataracts.

the deepening of the valley above its edge, while the deepening of the valley below continues. Thus the stream



Lachine Rapids, St. Lawrence River.

makes a sharp descent at the edge of the hard layer, forming *rapids* or *cascades*, or perhaps a *cataract*.

If the layer of rock is nearly level, the more rapid wearing away and weathering of the softer rock below may undermine its edge and form a precipice over which the stream leaps as a true waterfall, or cataract. If the stream is large enough to remove the fragments as fast as they fall from the overhanging hard layer, the cataract continues, but retreats gradually upstream. Why? If the fragments accumulate below the fall, however, they finally convert it into rapids or a series of cascades.

Sand Banks and Bars. When a swift stream enters a more level region, its current is checked and can no longer carry so much solid material; it therefore drops part of its load of detritus, or *sediment*. Thus at the mouths of steep mountain valleys there are frequently formed huge cones of sediment, or *alluvium*, which the streams have brought down from the valleys above but cannot carry so rapidly over the flatter part of the course below.

In the same manner steeply sloping branch streams may bring down sediment more rapidly than a gently sloping main stream can carry it off. Part of it is therefore deposited near the mouth of the branch, forming temporary *sand banks* or *bars*.

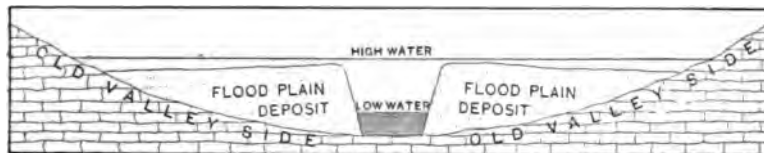
Deltas. When a stream enters a lake or the sea, its current is stopped and it drops most of its sediment. If the currents in the lake or sea are too feeble to carry it away, the sediment accumulates as a very flat alluvial cone at the mouth of the stream. Part of this cone may reach the sur-



A small cataract, Georgia

face of the water and be gradually converted into a triangular tract of marshy land. This impedes the outflow of the stream and divides it into several channels, through which it empties. Such a formation is called a *delta*, from its resemblance to the Greek letter of that name (Δ). By the continued deposit of sediment at the several mouths, the delta is continually enlarging and advancing further into the lake or sea.

Flood Plains. The rapid melting of snow, or a continued rainfall in its basin, swells a stream far beyond its usual limits, causing it to increase in width, and producing a *flood*, or *freshet*. At such times great quantities of detritus are washed into the stream and so load it with sediment that its waters become exceptionally muddy. The channel, where the current is swiftest, may carry its part of this load, but toward the sides of the flooded stream, where the current is more sluggish, part of the load is deposited on the valley floor. This deposit is left as a coating of



Illustrating formation of flood plains.

fine alluvium when the stream subsides to its ordinary width. Thus is gradually built up in time of flood a strip of "bottom land," or a *flood plain*, on either side of the ordinary channel of nearly every stream.

The flood plain deposit may become quite deep, and is generally very fertile, but it is subject to overflow, for it cannot be built higher than the highest floods, and, being composed of alluvium, it wears away rapidly in time of low water.

The surface of the flood plain is nearly level, but is often highest near the channel of the stream. Thus swampy places and sluggish streams, or *bayous*, are formed during low water along the lower, outside edges of flood plains.

Oxbow Loops. A sand bar, formed in the low-water bed of a stream, partly blocks the channel and forces the current against one of the banks of the flood plain. The soft alluvial bank is easily washed away, and thus a slight bend in the stream is formed (1). The current always flows against the outside of a bend and thus gradually increases it, while sediment is deposited in the more sluggish water along the inside bank (2). Thus streams cut for themselves very crooked low-water channels which meander back and forth across the flood plain.

In the lower courses of many large rivers which have wide and deep flood plains, these bends eventually take the form of great *oxbow loops* (3). Finally a *cut-off* is formed at the narrowing neck of the loop (4), which then becomes



Illustrating formation of oxbow loops.

the main channel. The ends of the old channel then gradually fill up with sediment, and the deserted part of the loop becomes a crescent-shaped pool or lake of stagnant water (5).

Tests. Define and explain the formation of rapids and cascades; cataracts; sediment; alluvium; sand bar; delta; flood plain; bayou; oxbow loop.

Supplemental Work. Draw a diagram and explain why a ledge of hard rock across a stream retards the deepening of the valley above.

GLACIERS.

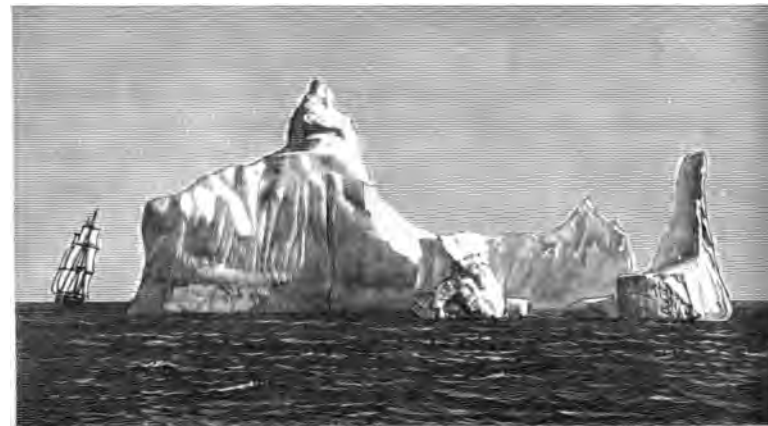


Aletsch glacier, Switzerland.

Formation. In polar regions, and in high mountains in all latitudes, the climate throughout the year is so cold that more snow falls than can be melted. The snow thus accumulates and becomes hundreds or even thousands of feet deep, so that its weight packs the lower part of the mass into solid ice, and forces this ice to creep forward, inch by inch, down the slope of the land. Such a sheet of slowly moving ice is called a *glacier*.

In Greenland and in other regions near the poles, glaciers cover the entire surface of the land with a continuous or "continental" ice sheet which moves downward into the sea, where great fragments, some of them as big as a small mountain, break off and float away as *icebergs*.

In regions where the lowlands are warm and where snow accumulates only near the summits of the mountains, the glaciers occupy the upper valleys only, creeping down the mountain sides, and many of them melting away entirely before they reach the sea.



Iceberg floating near Newfoundland.

Work of Glaciers. As a glacier creeps forward, the detritus under it—sand, stones, and huge masses of rock—becomes imbedded in the ice and is dragged forward over the solid rock beneath, scratching, grooving, polishing, and wearing away its surface, while the fragments are themselves worn round and smooth or ground to powder. Thus glaciers in their movement excavate rock basins, widen and deepen valleys, and lower and round the outlines of hills over which they travel. Much detritus rolls or is washed upon the surface of a valley glacier from the sides of the mountains which rise above it.

An enormous quantity of rocky material is thus carried by glaciers. If a glacier descends to the sea this material may be borne away by icebergs and distributed over the sea bottom when they melt; but if a glacier does not reach the sea, its rocky load is deposited along its melting end as a great irregular sheet of sand, gravel, boulders, and clay, called *glacial drift*.

If the melting end of a glacier remains long at the same place, the drift accumulates into an irregular range of hills called a *terminal moraine*.



Boulders deposited by an old valley glacier in California.

The Glacial Period. Thousands of years ago there was a long period of time, called the *glacial period*, when the climate of the northern hemisphere was colder than at present, and when the glaciers were much more extensive. The valley glaciers were larger than they now are, and glaciers were formed where none now exist. From the highland north of the St. Lawrence River, the Laurentian glacier then moved outward in all directions and covered North America with a continental ice sheet as far south as the Ohio and Missouri rivers, while another continental glacier moved over most of northern Europe from the Scandinavian peninsula.

When these great glaciers finally melted away they left their work so deeply impressed upon the surface of the land that it is yet plainly visible.

Much of each region is deeply covered with glacial drift; with many huge rounded boulders which are unlike any of the neighboring rock and must have been brought by the ice from a distance; and with thousands of peculiar whaleback-shaped hills, or *drumlins*; there are many great and small rock basins hollowed out by the moving ice sheet; and the solid rock of the region, wherever exposed, is found to be covered with glacial scratches and grooves.

In the hollows formed by the glacier, and in the old valleys in which the drift formed dams, many lakes collected. Some of these have been entirely filled up by sediment from their inlets, and others have been gradually emptied by the cutting down of their outlet streams. Thousands, however, remain and make the sites of the old Laurentian and Scandinavian glaciers the great lake regions of the world.

Tests. How are glaciers formed? How can their former presence in a region be detected? Define glacial drift; terminal moraine; drumlin.



A drumlin near Amherst, Massachusetts.

WAVES AND TIDES.

Waves. The wind blowing over any sheet of water throws its surface into *waves*. Light breezes cause mere ripples, but storm winds may heave the surface of deep water into billows as high as a three-story house.

The waves raised by a storm in one part of the sea may finally spread to the shores hundreds of miles away, and as there is seldom a time when strong winds are not blowing in some part of the sea, its surface is nearly always heaving and tossing in waves.

Waves do not affect the water to any great depth, but when a wave enters shallow water its lower part drags on the bottom, while the upper part, rushing onward, rolls over or breaks, thus forming a *breaker*. Little waves break very close to the shore line, but big waves drag on the bottom in much deeper water, and hence may break at some distance from the land.

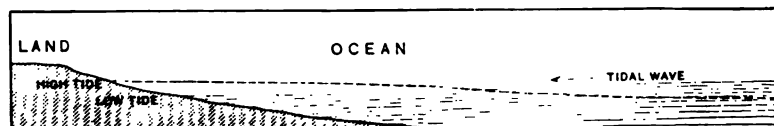
Tides. Since waves depend upon the wind, they are very irregular—at times high and fierce, at times low and gentle. There is another movement of the sea, however, which is very regular. On the seacoast the water for several hours gradually rises, at some places becoming many feet deeper; then for several hours it gradually falls to about its former level, when it again slowly rises, and so on. This slow and regular rise and fall of the sea is called the *tide*. The rise is *flood tide*, and the fall, *ebb tide*.

Like the earth, the sun, the moon, and the stars possess *gravity*; that is, each has the power to pull loose objects toward itself. The pull is strongest on objects near these bodies, but it also affects objects at *any* distance. Thus the earth itself is affected by the gravity of both the sun and the moon. Though the attraction of the sun on the whole earth is much stronger than that of the moon, still the moon is so much nearer us that its effect is more apparent. It causes the surface of the sea to rise in two low but broad tidal swells or waves, one on each side of the earth.



As the earth rotates, these waves travel over the surface of the sea, keeping a little behind the moon. When the crest of one of these waves reaches the coast, it is high tide; when the trough between the waves reaches the coast, it is low tide.

While the earth is rotating, the moon is moving forward in the sky, so that the earth has to turn for nearly twenty-five hours to bring the same



point under the moon again, and during this time two complete tidal waves pass the point.

Wind waves affect the surface water only, and make little or no current; but in following the moon around the earth the tidal waves cause powerful currents which extend to the very bottom of the sea.

In the open sea the tidal wave is so low that its passage is imperceptible, but as it advances between the headlands of a coast the shallowing water and the approaching shores force the wave to become much higher. At the heads of some narrowing bays it is as much as 50 or 60 feet high; on more open coasts heights of from 6 to 12 feet are usual.

In some estuaries and river mouths the drag of the heightened tidal wave on the bottom causes the wave to form a breaker, called a *bore*, which rushes rapidly up the river and is very dangerous to shipping.

Work of Waves and Tides. The force with which waves dash upon the coast is very great. If the shore is high and rocky, the waves pick up fragments of loosened rock and hurl them against the cliffs, thus loosening other fragments and undermining and rapidly cutting back the front of the cliffs. The fragments, pounded against the cliffs or rolled backward and forward upon one another, are worn away, first to pebbles and then to fine sand.



Bass Head, on the high and rocky coast of Maine.

Some of the sand is carried out into deep water, where it settles to the bottom, making its slope gentler. But much of the sand made in this way on exposed and rocky headlands is carried by tidal currents and by the wash of the waves into sheltered coves, or to straight stretches of low and gently sloping coast. There it is thrown upon the shore to form a smooth sand beach. Such a beach is really a protection to the shore, and it is more lasting than a high and rocky coast, which receives the full force of the waves.



Long Beach, Florida.

Thus the action of the waves tends to make the coast more uniform, by cutting back and reducing rocky headlands, and by building out the shore lines of the bays.

Barrier Beaches. Great storm waves break at some distance out from the shore line of a low and uniform coast. The sand they deposit where they break forms a shoal, or *bank*, which is gradually built up into a *bar* and by continued deposit may at last reach the surface, forming a long line of narrow, sandy islands, or *barrier beaches*, fringing the coast and separated from it by a shallow *lagoon*.

The lagoon, however, is gradually filled up by the sediment carried into it by the streams from the mainland, and by the remains of vegetation that grows along its margins. It is thus converted into a marsh and then into solid land, while another line of barrier beaches may form outside; thus the coast grows outward.



Sandy Hook, New Jersey.

Spits and Sandy Hooks. Tidal currents carrying sand are constantly flowing along the coast close to the shore. Such currents flowing out of a bay are frequently turned to the right or the left by meeting other currents flowing along the coast. Between such currents is a narrow strip of still water, in which sand from both currents is deposited. Thus may be built out into the bay, from one side of its mouth, a long, narrow *spit* or *sandy hook*. Many low capes are formed in this way.

Coral Reefs and Islands. Where the sea water is warm, and not too deep, and where currents bring plenty of food, little animals called *coral polyps* live in great colonies attached to the sea bottom. The polyp extracts from the sea water some of its dissolved lime, and this goes to enlarge the stony skeleton by which the animal is attached to the rocky base of the colony.

When a polyp dies its stony skeleton remains as an addition to the base, while young polyps appear upon the base like buds on a tree. These grow and die, leaving their skeletons behind, and are replaced by other polyps. Thus by the growth and death of countless polyps the rocky base of the colony may gradually be built up to the surface of the sea to form a *coral reef*, which by the beach-forming action of waves and currents may be raised above the water to form a *coral island*.



Great Barrier coral reef, Australia.

Such coral islands often take the form of rings of low land wholly or partly surrounding shallow lagoons; such a ring-shaped coral island is called an *atoll*. Coral reefs which fringe the warmer coasts of the continents may eventually become part of them, as do barrier beaches.

Tests. Define and explain waves; breakers; tides; flood tide; high tide; ebb tide; low tide; a bore; a barrier beach; a sandy hook; a coral reef. Why is high tide at any spot a little later every day?

Supplemental Work. Read or recite Ingelow's "High Tide on the Coast of Lincolnshire," Kingsley's "Sands of Dee," Tennyson's "Crossing the Bar," Holmes's "Chambered Nautilus."

THE ROCKY LAYERS OF THE LAND.

Thus the atmospheric agents and moving water are constantly wearing away the surface of the land and transporting the material to some lake or to the sea, where it is deposited on the bottom in nearly level layers of sand, gravel, or mud.

The gravel or sand, being heavier, sinks sooner and is deposited nearer the shore, while the finer particles which compose mud are carried farther away from land. But nearly all the sediment brought down to the sea is deposited within a few hundred miles of the coast, and with it are mixed the bones of animals washed from the land, or of sea animals that die and sink from the water above. Farther from land almost the only deposits are the shells of sea animals. There are millions of them, however, many of them very tiny, and their deposit gradually makes a thick layer of slime, or *ooze*, on the deep sea floor.



Ooze magnified.

Year after year layer is deposited on layer, until the weight above, aided possibly by heat from within the earth, changes the lower layers into stone again, in which the forms of the shells and bones are preserved as *fossils*. The sandy deposits near the shore become layers of sandstone; the deposits of mud and clay become layers of shale or soapstone; and the oozes become different kinds of limestone and chalk, which are often little more than a mass of tiny fossils.

By gradual upheaval these layers of hardened sediments on the sea bottom become land, and by the pressure and heat produced in the upheaval they may be hardened, crystallized, and changed still further—thus limestone may become marble; sandstone, quartzite; and shale, slate. Some of the more deeply buried layers may even be melted and changed to granite or to lava.

In this way have been formed nearly all the solid rocks which we see. At some time in the past the material of which they are composed was part of an old land surface; it was worn away and became soft sediment on the sea floor; it slowly hardened to rock and was upheaved to become the present land, which is now being worn away again.

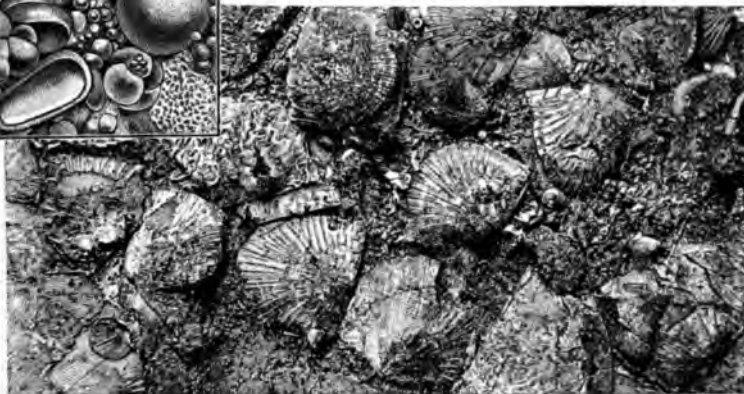
Peat and Coal. Certain kinds of moss and other plants grow thickly on the surface of fresh water near the shore in many shallow ponds and lakes. By the interlacing

of their roots they may in time cover the entire surface of the water with a floating mat of vegetation. The thick mat is increased by the yearly growth on top, while from beneath it pieces of dead vegetable matter fall to the bottom of the lake, and accumulate as a dark mudlike mass called *muck* or *peat*. This may eventually fill the lake, converting it into a peat swamp, or *bog*. The muck, being partly decayed vegetable matter, makes a good fertilizer, and when thoroughly dried is also used for fuel.

Thousands of years ago great swamps, somewhat like the present peat bogs, but containing a vastly more luxuriant vegetation, existed in many lowlands. After their formation they were slightly depressed below the sea and were covered by layers of mud and sand. The sediment gradually hardened to layers of rock, and the peat to beds of the black stonelike substance which we call *coal*.

As the buried peat slowly changed it gradually became *lignite*, or brown coal, which is much better fuel than peat, while with greater age it is changed to true *bituminous* or *soft coal*, which is still better fuel. If these beds are greatly folded in upheaval, the heat and pressure hasten their change into coal, and may change them into *hard* or *anthracite* coal—or even into *graphite*, of which lead pencils are made.

Petroleum and Natural Gas. Vegetable or animal matter, which ages ago was deeply buried under sediments, has sometimes been gradually changed, not into coal, but into *rock oil*, or *petroleum*, and into *natural gas*. Both of these substances also make good fuel. They are obtained by boring wells through the overlying layers of rock.



Fossiliferous limestone.

Tests. How does the ocean deposit near the shore differ from the deep sea deposit? Why? Explain the formation of sandstone; quartzite; shale; slate; limestone; marble. Of peat; lignite; bituminous coal; anthracite coal. Of petroleum; natural gas.

Supplemental Work. Bring to school specimens of one kind of rock and of one kind of mineral formed from animal

or vegetable matter. Label each specimen, and keep the collection in the schoolroom. Write a short story of the formation of one of the specimens.

TOPICS ON LOWERING OF THE LAND SURFACE.

I. **EROSION.** Definition. Wind: erosive work. Atmospheric moisture: source; forms; erosive work. Ground water: source; uses; erosive work. Streams: source; deepening work; broadening work. Glaciers: source; motion; erosive work. Waves: erosive work.

II. **TRANSPORTATION.** Wind. Water. Ice. Direction.

III. **DEPOSITION.** Dunes. Stream deposits: alluvial cones; sand bars; flood plains; deltas. Spring deposits. Cave deposits. Veins. Glacial drift. Shore deposits: beaches; bars; sandy hooks; coral reefs. The layers of rocks: of rocky origin; of animal or vegetable origin.

IV. **FEATURES OF SURFACE WATERS.** Springs: origin; classes; uses. Streams: source; bed; divides; flood plains; falls; meanders; bayous; mouths. Lakes: origin; inlets; outlets; classes. Glaciers: regions; classes.

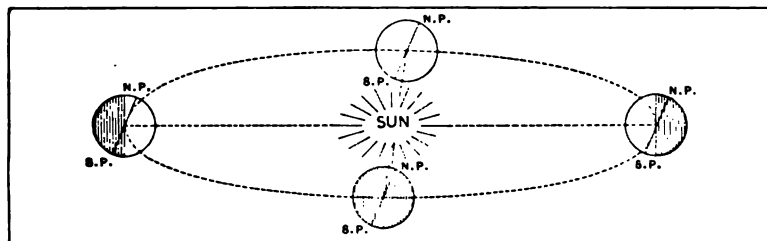
CLIMATE.

SEASONS.

Revolution. While the earth is turning on its axis it is also moving forward in an almost circular path, or *orbit*, around the sun. This movement of the earth is called its *revolution*. What is the difference between a rotation and a revolution of the earth? How long does it take the earth to rotate once on its axis? The time required by the earth to make one complete revolution around the sun is called a *year*.

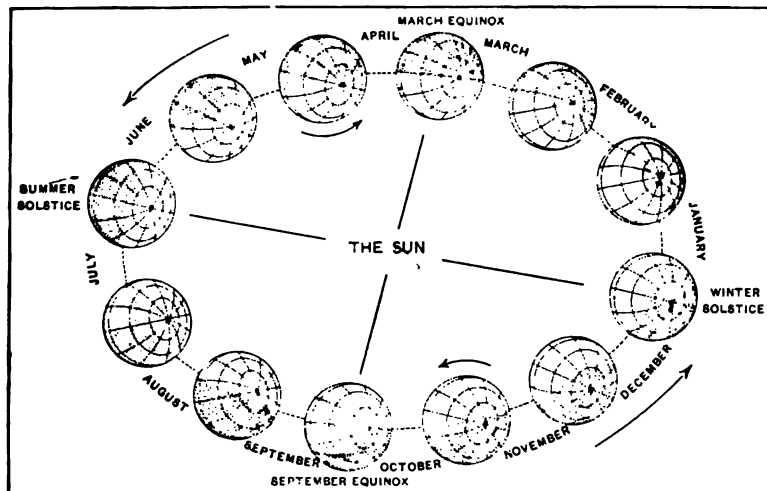
The orbit is really elliptical, but differs so slightly from a circle that it is most accurately represented as circular.

Inclination of Axis. As the earth travels around its orbit, the axis always points in nearly the same direction.



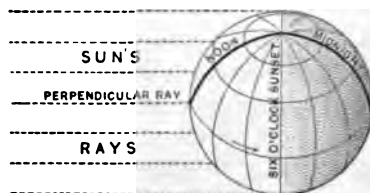
The axis is not perpendicular to the orbit; it leans, or inclines, about $23\frac{1}{2}$ degrees from the perpendicular, as shown in the diagram above.

Effects. It is because of this inclination of the axis that the hours of sunrise and sunset change from day to day, and that one half of the year is warmer than the other half.



Length of Days and Nights. The diagram above shows the position of the north pole with respect to the edge of the sun-lighted half of the earth each month in the year. Name the months in which the pole is exactly on the line between the lighted and the dark half of the earth. At these times the sun is exactly over the equator; hence the sunlight extends to the same distance on both sides of the equator, or to both poles. As the earth rotates in this position the sun rises and sets at six o'clock, and the days and nights are everywhere of equal length; hence these dates are called *equinoxes* (equal nights).

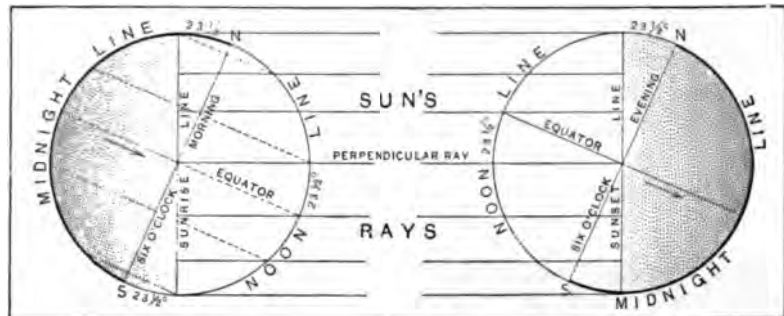
The days and nights are always of equal length on the equator, but elsewhere, except at the equinoxes,



At the March equinox.

they are never equal. During what months is the north pole in the lighted hemisphere? During what months is it in the dark hemisphere? Thus, at the poles there are six months of continuous daylight, followed by six months of continuous darkness. When the earth passes either equinox, the poles gradually recede from the sunrise and sunset line for three months, and then approach and reach it again three months later at the other equinox.

When is the north pole farthest within the lighted hemisphere? When farthest within the dark hemisphere? At these dates the day and night are of most unequal length.



About June 21.

About December 21.

About June 21 the north pole is $23\frac{1}{2}^\circ$ within the lighted hemisphere; the perpendicular rays of the sun fall on places $23\frac{1}{2}^\circ$ north of the equator. How far within the dark hemisphere is the south pole? As the earth rotates in this position, the sun rises and sets at six o'clock at the equator, and the days and nights there are equal, but the sun rises earlier and earlier at places nearer and nearer to the north pole, and later and later at places nearer and nearer to the south pole; hence in the northern hemisphere the days are longer than the nights. Are they then longer or shorter than the nights in the southern hemisphere? Places within $23\frac{1}{2}^\circ$ of the north pole are in the sunlight, while places within $23\frac{1}{2}^\circ$ of the south pole are in darkness, throughout an entire rotation of the earth.

About December 21 the north pole is within the dark, and the south pole within the lighted half of the earth, while the perpendicular rays of the sun fall on places $23\frac{1}{2}^\circ$ south of the equator. From the diagram explain what effect this position has upon the length of the days and nights in the northern and in the southern hemisphere.

The Seasons. Why is it usually warmer during the daytime than at night? Do we live north or south of the equator? Compare the lighted part of the *northern hemisphere* about June 21 with its lighted part about December 21. Does the northern hemisphere receive more sunshine in June or in December? In which of these months is the weather warmer in the northern hemisphere? Why? In which of these months is the weather warmer in the southern hemisphere? Why?

Thus the inclination of the earth's axis causes *summer* and *winter*. When it is winter in the southern hemisphere what season prevails in the northern hemisphere? At the equinoxes just one half of each hemisphere is in the warm sunshine. At these times occur *spring* and *autumn*, when the temperature is intermediate between those of summer and winter.

Tests. Define the earth's orbit. What is its shape? Define revolution; a year; equinoxes; summer; winter; spring and autumn. What two causes combine to produce changes in the length of day and night?

Supplementary Work. Darken the schoolroom, and, by means of a ball and a lamp, illustrate the position of the earth at the equinoxes; about June 21; about December 21. Read or recite "They come! The Merry Summer Months," Motherwell; "The First Snowfall," Lowell; "The Voice of Spring," Hemans; "The Death of the Flowers," Bryant.

ZONES AND HEAT BELTS.

The Tropics. At the March equinox the sun is directly overhead at the equator. By about June 21 the perpen-

Such coral islands often take the form of rings of low land wholly or partly surrounding shallow lagoons; such a ring-shaped coral island is called an *atoll*. Coral reefs which fringe the warmer coasts of the continents may eventually become part of them, as do barrier beaches.

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THE ROCKY LAYERS OF THE LAND.

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Ooze magnified.

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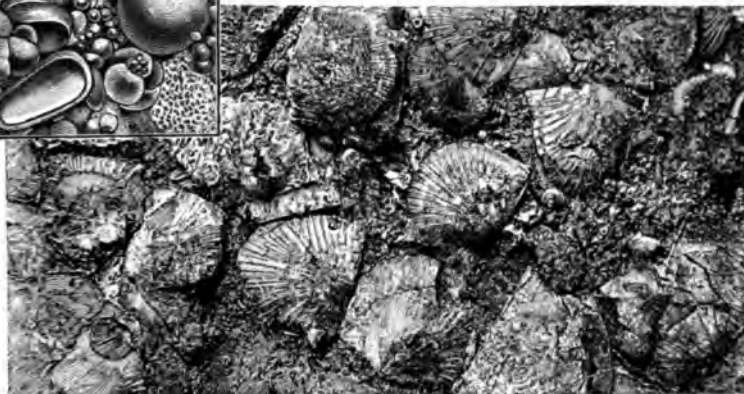
Peat and Coal. Certain kinds of moss and other plants grow thickly on the surface of fresh water near the shore in many shallow ponds and lakes. By the interlacing

of their roots they may in time cover the entire surface of the water with a floating mat of vegetation. The thick mat is increased by the yearly growth on top, while from beneath it pieces of dead vegetable matter fall to the bottom of the lake, and accumulate as a dark mudlike mass called *muck* or *peat*. This may eventually fill the lake, converting it into a peat swamp, or *bog*. The muck, being partly decayed vegetable matter, makes a good fertilizer, and when thoroughly dried is also used for fuel.

Thousands of years ago great swamps, somewhat like the present peat bogs, but containing a vastly more luxuriant vegetation, existed in many lowlands. After their formation they were slightly depressed below the sea and were covered by layers of mud and sand. The sediment gradually hardened to layers of rock, and the peat to beds of the black stonelike substance which we call *coal*.

As the buried peat slowly changed it gradually became *lignite*, or brown coal, which is much better fuel than peat, while with greater age it is changed to true *bituminous* or *soft* coal, which is still better fuel. If these beds are greatly folded in upheaval, the heat and pressure hasten their change into coal, and may change them into *hard* or *anthracite* coal—or even into *graphite*, of which lead pencils are made.

Petroleum and Natural Gas. Vegetable or animal matter, which ages ago was deeply buried under sediments, has sometimes been gradually changed, not into coal, but into *rock oil*, or *petroleum*, and into *natural gas*. Both of these substances also make good fuel. They are obtained by boring wells through the overlying layers of rock.



Fossiliferous limestone.

Tests. How does the ocean deposit near the shore differ from the deep sea deposit? Why? Explain the formation of sandstone; quartzite; shale; slate; limestone; marble. Of peat; lignite; bituminous coal; anthracite coal. Of petroleum; natural gas.

Supplemental Work. Bring to school specimens of one kind of rock and of one kind of mineral formed from animal

or vegetable matter. Label each specimen, and keep the collection in the schoolroom. Write a short story of the formation of one of the specimens.

TOPICS ON LOWERING OF THE LAND SURFACE.

I. **EROSION.** Definition. Wind: erosive work. Atmospheric moisture: source; forms; erosive work. Ground water: source; uses; erosive work. Streams: source; deepening work; broadening work. Glaciers: source; motion; erosive work. Waves: erosive work.

II. **TRANSPORTATION.** Wind. Water. Ice. Direction.

III. **DEPOSITION.** Dunes. Stream deposits: alluvial cones; sand bars; flood plains; deltas. Spring deposits. Cave deposits. Veins. Glacial drift. Shore deposits: beaches; bars; sandy hooks; coral reefs. The layers of rocks: of rocky origin; of animal or vegetable origin.

IV. **FEATURES OF SURFACE WATERS.** Springs: origin; classes; uses. Streams: source; bed; divides; flood plains; falls; meanders; bayous; mouths. Lakes: origin; inlets; outlets; classes. Glaciers: regions; classes.

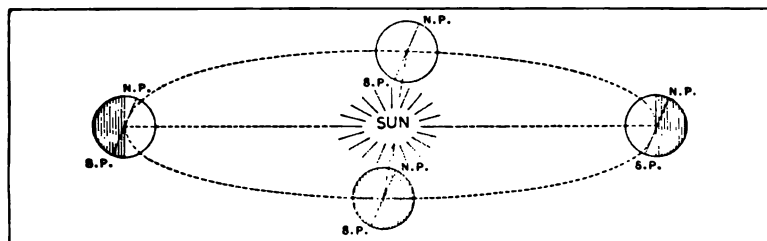
CLIMATE.

SEASONS.

Revolution. While the earth is turning on its axis it is also moving forward in an almost circular path, or *orbit*, around the sun. This movement of the earth is called its *revolution*. What is the difference between a rotation and a revolution of the earth? How long does it take the earth to rotate once on its axis? The time required by the earth to make one complete revolution around the sun is called a *year*.

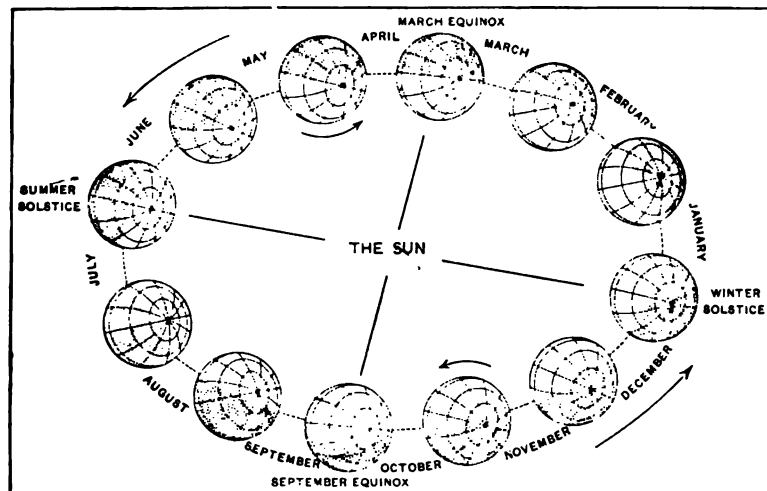
The orbit is really elliptical, but differs so slightly from a circle that it is most accurately represented as circular.

Inclination of Axis. As the earth travels around its orbit, the axis always points in nearly the same direction.



The axis is not perpendicular to the orbit; it leans, or inclines, about $23\frac{1}{2}$ degrees from the perpendicular, as shown in the diagram above.

Effects. It is because of this inclination of the axis that the hours of sunrise and sunset change from day to day, and that one half of the year is warmer than the other half.



Length of Days and Nights. The diagram above shows the position of the north pole with respect to the edge of the sun-lighted half of the earth each month in the year. Name the months in which the pole is exactly on the line between the lighted and the dark half of the earth. At these times the sun is exactly over the equator; hence the sunlight extends to the same distance on both sides of the equator, or to both poles. As the earth rotates in this position the sun rises and sets at six o'clock, and the days and nights are everywhere of equal length; hence these dates are called *equinoxes* (equal nights).

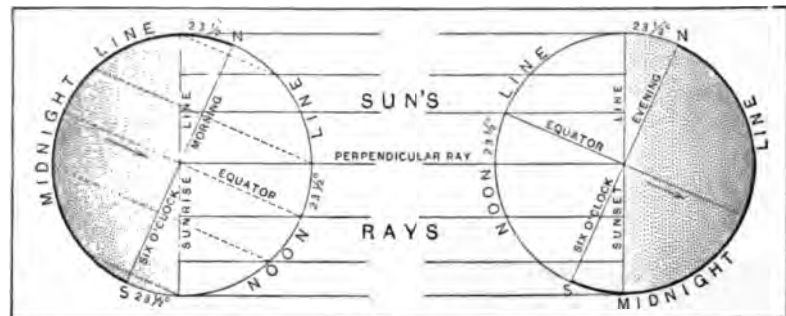
The days and nights are always of equal length on the equator, but elsewhere, except at the equinoxes,



At the March equinox.

they are never equal. During what months is the north pole in the lighted hemisphere? During what months is it in the dark hemisphere? Thus, at the poles there are six months of continuous daylight, followed by six months of continuous darkness. When the earth passes either equinox, the poles gradually recede from the sunrise and sunset line for three months, and then approach and reach it again three months later at the other equinox.

When is the north pole farthest within the lighted hemisphere? When farthest within the dark hemisphere? At these dates the day and night are of most unequal length.



About June 21.

About December 21.

About June 21 the north pole is $23\frac{1}{2}^\circ$ within the lighted hemisphere; the perpendicular rays of the sun fall on places $23\frac{1}{2}^\circ$ north of the equator. How far within the dark hemisphere is the south pole? As the earth rotates in this position, the sun rises and sets at six o'clock at the equator, and the days and nights there are equal, but the sun rises earlier and earlier at places nearer and nearer to the north pole, and later and later at places nearer and nearer to the south pole; hence in the northern hemisphere the days are longer than the nights. Are they then longer or shorter than the nights in the southern hemisphere? Places within $23\frac{1}{2}^\circ$ of the north pole are in the sunlight, while places within $23\frac{1}{2}^\circ$ of the south pole are in darkness, throughout an entire rotation of the earth.

About December 21 the north pole is within the dark, and the south pole within the lighted half of the earth, while the perpendicular rays of the sun fall on places $23\frac{1}{2}^\circ$ south of the equator. From the diagram explain what effect this position has upon the length of the days and nights in the northern and in the southern hemisphere.

The Seasons. Why is it usually warmer during the daytime than at night? Do we live north or south of the equator? Compare the lighted part of the *northern hemisphere* about June 21 with its lighted part about December 21. Does the northern hemisphere receive more sunshine in June or in December? In which of these months is the weather warmer in the northern hemisphere? Why? In which of these months is the weather warmer in the southern hemisphere? Why?

Thus the inclination of the earth's axis causes *summer* and *winter*. When it is winter in the southern hemisphere what season prevails in the northern hemisphere? At the equinoxes just one half of each hemisphere is in the warm sunshine. At these times occur *spring* and *autumn*, when the temperature is intermediate between those of summer and winter.

Tests. Define the earth's orbit. What is its shape? Define revolution; a year; equinoxes; summer; winter; spring and autumn. What two causes combine to produce changes in the length of day and night?

Supplementary Work. Darken the schoolroom, and, by means of a ball and a lamp, illustrate the position of the earth at the equinoxes; about June 21; about December 21. Read or recite "They come! The Merry Summer Months," Motherwell; "The First Snowfall," Lowell; "The Voice of Spring," Hemans; "The Death of the Flowers," Bryant.

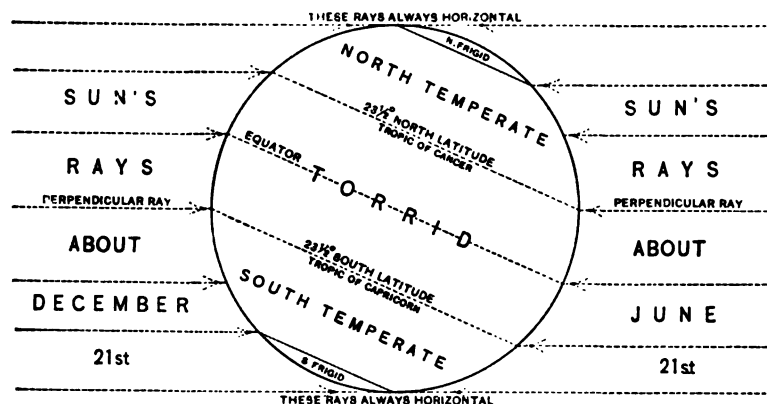
ZONES AND HEAT BELTS.

The Tropics. At the March equinox the sun is directly overhead at the equator. By about June 21 the perpen-

dicular rays have advanced into the northern hemisphere. On what parallel do they then fall? Here they turn back and recede southward. When do they again fall on the equator? Where do the perpendicular rays fall about December 21? There they turn back and advance northward, reaching the equator in March. Hence the parallels $23\frac{1}{2}^{\circ}$ north and south of the equator are called *tropics*, from a word meaning "to turn"—the northern one is the *Tropic of Cancer*; the southern, the *Tropic of Capricorn*.

The Polar Circles. The parallel $23\frac{1}{2}^{\circ}$ from either pole incloses a region which at one time in the year is in darkness during a complete rotation of the earth, and at another time is in sunshine during a complete rotation. These parallels are called *polar circles*—the northern one, the *Arctic Circle*; the southern, the *Antarctic Circle*.

The Zones. Is it usually warmer when the sun's rays fall from high in the sky, as they do in the middle of the day, or when they are nearly horizontal, as at sunrise and sunset? The sun's rays are always perpendicular somewhere between the tropics, and that part of the earth's surface is quite warm throughout the year; hence the strip between the tropics is called the *torrid*, or hot, zone. Because the sun's rays do not reach the regions within the polar circles during part of the year, and during the remainder are nearly horizontal, these regions are nearly



always cold and are called the *frigid*, or cold, zones. The regions between the torrid and the frigid zones are called *temperate* zones.

How do the temperate zones compare in temperature with the torrid zone; with the frigid zones? Still there are parts of the temperate zones which at times are hotter than parts of the torrid zone, and there are parts which at times are colder than parts of the frigid zones. So the tropics and polar circles do not form the boundaries of the true heat belts.

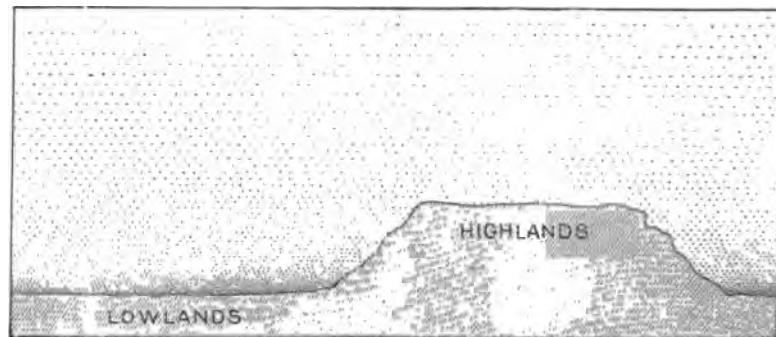
This is partly due to the fact that, as the sun advances to its June position over the northern tropic, the boundaries of all the heat belts also advance northward; and as the sun retreats to its December position over the southern tropic, the boundaries of all the heat belts retreat southward with it.

Other reasons for the irregular boundaries of the true heat belts are the irregular distribution of land and water over the earth, and the differences in elevation of the land surface.

Effect of Land and Water. The sea does not change greatly in temperature during the year. The temperature of the land, however, changes greatly in latitudes where

the days and nights are of very unequal length. The land is slightly warmer than the sea in summer, but much colder in winter.

The upper part of the atmosphere, resting on the part beneath, compresses it and makes it *denser*; thus the atmosphere is densest at the surface of the sea, but on high mountain tops is so *rare*, or thin, that it will scarcely support life.



Illustrating comparative density of the air.

The heat rays of the sun pass easily through the rare part of the atmosphere, and, as there is scarcely any air to warm, they lose but little of their heat there. They pass through the lower, denser part with increasing difficulty, however, and give to it about half of their heat before they reach the earth's surface; hence the rays themselves warm the lower air more than the upper air.

The heat rays which reach the solid land can penetrate it to a very slight depth, and thus quickly make its surface even warmer than the lower air. This excess of heat tries to escape back through the atmosphere, but it penetrates the dense air above lowlands very slowly and heats it still further.

At night, however, the supply of sun heat being cut off, the rare upper air permits the escape of heat from the dense lower air, which in turn robs the land surface of its heat. Thus during the long nights of winter the land quickly loses the heat that accumulates at its surface during the long days of summer.

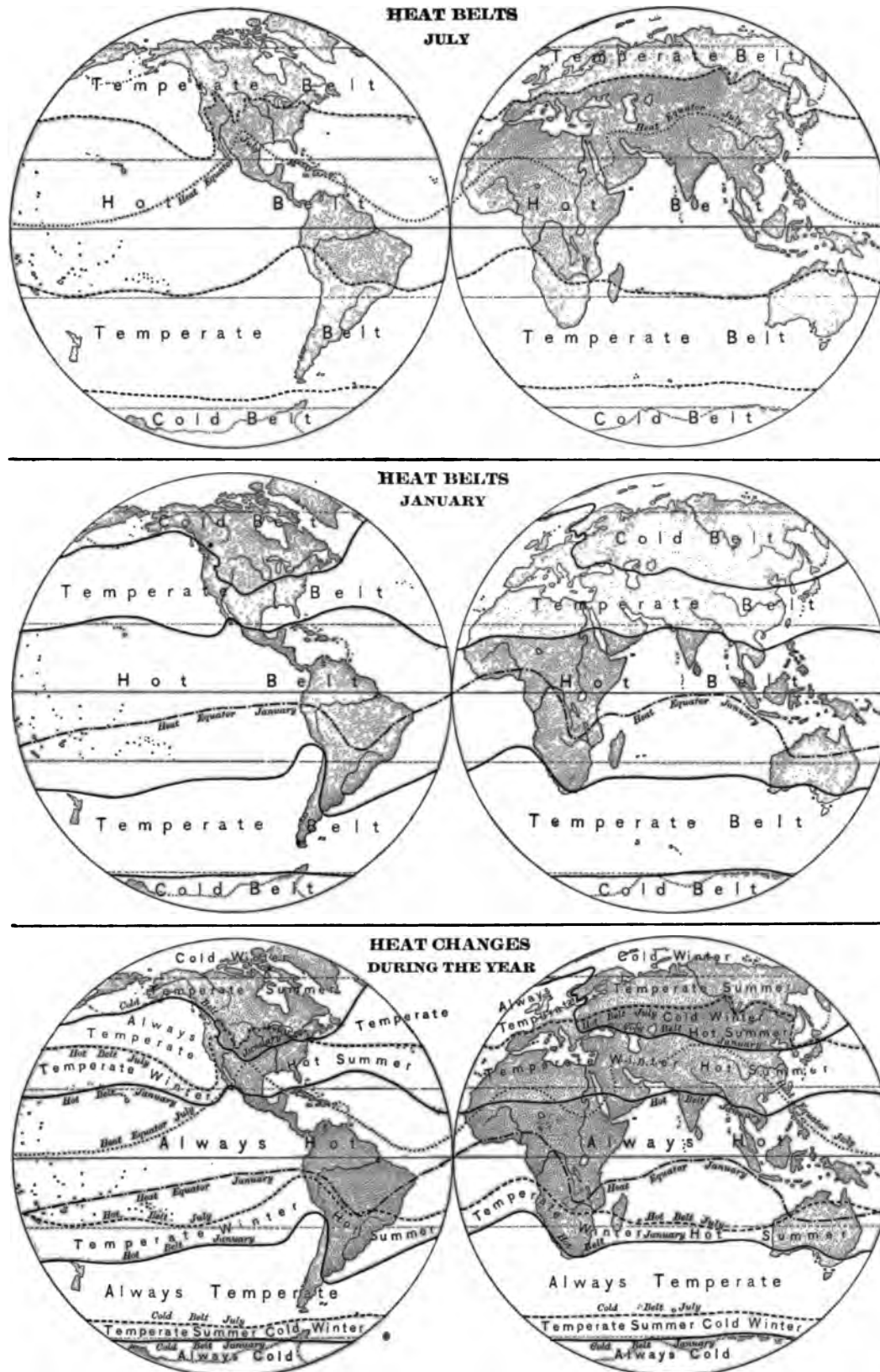
The sun's heat rays which reach the sea penetrate and warm it to a greater depth than the land is warmed, and the warm water may move to cooler regions in waves or currents. Hence the surface of the sea is not warmed so quickly or so greatly as the land. But neither does it cool so quickly at night, for as the surface water cools it is replaced by warmer water from below.

Effect of Elevation. At great elevations the air is so rare that it is but slightly warmed either by the sun's rays or by the heat escaping from the earth. It thus happens that the *climate*, or prevailing weather, of highlands is colder than that of lowlands.

Thus in the torrid zone, although snow is never seen in the lowlands, the tops of high mountains bear snow banks that are never entirely melted away.

But it must not be supposed that mountain summits are always cold. For the very reason that the thin air cannot take much heat from the sun's rays, the sunshine itself on mountains is hotter than on lowlands; but at night, or in the shade, the weather is cold.

True Heat Belts. Why do the true heat belts differ from the zones? The boundaries of the true heat belts in January and in July are shown on the following maps. Each boundary line is an *isotherm*; that is, a line passing through places having the same temperature. The boundary of the cold belt has about the temperature of freezing water (30°); that of the hot belt has the comfortable temperature of a sitting room (70°).



Where are the sun's rays perpendicular about July 1? At this season the accumulation of heat in the great land masses of North America and Eurasia carries the edge of the hot belt far northward. Where does the *heat equator*, or line of greatest heat, lie farthest north at this season? Where is it nearest the true equator? What heat belt surrounds the north pole at this season? The south pole? As July is in the winter of the southern hemisphere, the hot belt in that hemisphere shrinks in width, while the south cold belt is greatly enlarged. As the surface of the southern hemisphere is mostly water, the boundaries of its heat belts are comparatively regular.

Compare the January positions of the heat equator and the heat belts

with their July positions. Explain the differences in position.

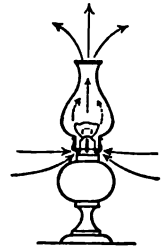
In the lowest pair of maps the boundaries of the heat belts in both January and July are drawn, in order to show the temperature changes of each region during the whole year. What parts of the land surface of the world are always hot? What parts have a temperate winter and a hot summer? What parts of the land surface are always temperate? What parts have a temperate summer and a cold winter? What parts have a hot summer and a cold winter? What part of the world is always cold?

Tests. Name the zones; their boundaries. Define zone; tropic; rare; dense; isotherm. How is heat distribution affected by land and water; by elevation? Why do the true heat belts differ from the zones?

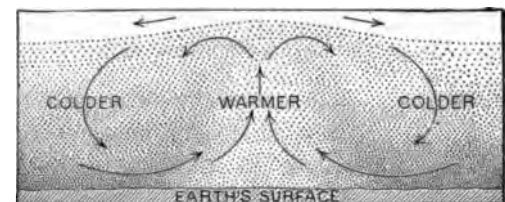
Supplemental Work. Draw maps of the hemispheres, showing the tropics, polar circles, and true heat belts in summer and in winter. Read "The Discoverer of the North Cape," by Longfellow; and "Tropical Vegetation in South America," by Kingsley, in Barnes's Fifth Reader.

WINDS.

When a fire is burning on the hearth the air moves toward it along the floor of the room and rises up the chimney with the smoke. In the same way the air moves toward the bottom of the chimney of a lighted lamp and when heated rises through the chimney.



Like nearly all other substances, the air expands and occupies more space when it is heated. If the atmosphere over any region becomes warmer than that over surrounding regions, it expands upward and becomes deeper over the hot region. The upper air therefore flows off side-



wise from above the warmer region, while surface currents of cooler and heavier air flow in below and force the warmer and lighter air upward. Such surface currents of air are called *winds*.

Trade Winds. Over the heat equator the air is always warmer and more expanded than that nearer the poles, and hence throughout the year there are nearly constant winds blowing toward the heat equator from some distance on both sides. These winds are especially well marked on the level surface of the

open oceans. They are gentle, steady winds, and are called *trade winds*.

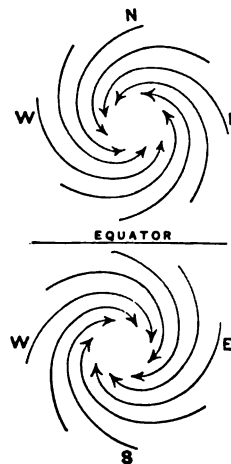
Because of the rotation of the earth, the moving air turns out of a straight course as it advances, turning to the right in the northern hemisphere, but to the left in the southern. The trade winds, therefore, approach the heat equator obliquely. What is their direction north of the equator? South of the equator?

Belts of Calms. The northeast and southeast trade winds, when they meet, are forced slowly upward by the cooler and heavier air behind. The rising air expands and cools. What becomes of its vapor? (p. 14.) The place of meeting of the trade winds is therefore marked by a narrow belt of light breezes or calms, in which there is almost constant cloudy and rainy weather. This belt is called the *equatorial calms*. Find it on the map.

At the outer edge of the trade winds, in both the northern and the southern hemisphere, is a narrow belt or region in which the air is slowly settling down from the upper atmosphere, and becoming warmer as it descends. Why are these not rainy belts? These belts are consequently marked by calms and clear weather. They are called the *tropical calms*.

Prevailing Westerly Winds. Beyond the tropical calms the general movement of the atmosphere is toward the poles—from the southwest in the northern hemisphere, and from the northwest in the southern hemisphere.

Winds gradually acquire the temperature of the surface over which they blow. The prevailing westerlies occur in latitudes where the land is warmer than the sea in summer, and cooler than the sea in winter. These winds, therefore, tend to equalize the temperature on the west coasts of the continents in the temperate zones—making the summers cooler and the winters warmer than they are on the east coasts.



Cyclones. The winds of the temperate zones, however, are rendered very irregular by being drawn into vast whirls called *cyclones*, which are constantly forming and moving eastward in various parts of these zones.

Because of the earth's rotation, cyclones on the same side of the equator always whirl in the same direction, but on the other side of the equator they whirl in the opposite direction, as shown in the diagram. Do the winds move from or toward the equator on the east side of cyclones? On the west side?

As the winds whirl around the center of the cyclone, they get nearer and nearer to it, and

travel faster and faster until they may become *storm winds*. In the center of the cyclone the air rises and rapidly cools, and on the east side of the cyclone the air also cools, because it is blowing away from the equator. Hence the center and east side of cyclones are generally marked by clouds and rain or snow. The western side of the cyclone, in which the wind is whirling from a colder region toward the equator, is marked by clearing, cool, or cold weather. Why?

Nearly all of our ordinary storms are simply the passing of such cyclones. These great atmospheric whirls form so frequently that the regions of the westerly winds are the stormiest in the world. The whirls move eastward for great distances, sometimes traveling as much as halfway around the earth, before they finally die away.

Monsoon Winds. Owing to the shifting of the heat equator, and of the belts of calms, with the change of seasons, much of the land in the torrid zone is north of the equatorial calms in January, and south of them in July. As the prevailing winds blow obliquely toward these calms, it follows that in many torrid lands the winds blow from one direction in summer and from another direction in winter. This seasonal change in the

direction of the wind is strongly marked in southern Asia and eastern Africa, and on those coasts the prevailing winds are called *monsoons*, from a word meaning "season."

Where does the heat equator lie in January in the eastern hemisphere? (p. 25.) In winter the regular northeast trades prevail over the northern Indian Ocean. Why?

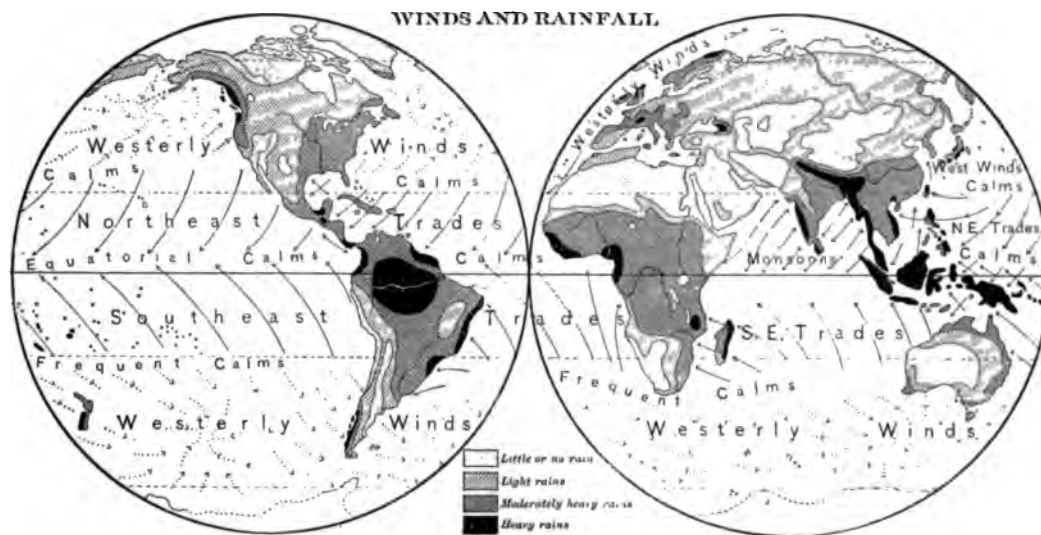
Where is the heat equator over the eastern hemisphere in July? In summer the southeast trade winds sweep north of the true equator, and, being turned to the right by the rotation of the earth, reach the coast of Asia as a steady southwest monsoon. This blows for several months, until the heat equator gradually approaches the true equator in the early fall. Then the northeast monsoon (or regular trade wind) prevails, while the heat equator is in the southern hemisphere.

Tests. Define and explain winds; trade winds; equatorial calms; tropical calms; prevailing westerlies; cyclones; monsoons.

Supplemental Work. By holding narrow strips of paper over a lighted lamp, show that heated air is lighter than the colder air around it. Read pp. 207-229 Waldo's "Elementary Meteorology." Read or recite "The Hurricane," by Bryant; "The Wind on a Frolic," by Wm. Howitt.

RAINFALL.

Cause. Where does most of the vapor in the atmosphere come from? (p. 13.) What causes it to change into cloud, rain, or snow? The winds are the great vapor carriers, and hence the rainfall of the world depends largely upon the winds. But the winds do not yield cloud and rain unless the vapor they carry is chilled. The vapor may be chilled (1) by rising higher in the atmosphere, or (2) by being carried into a colder region. The term *rainfall* usually includes snowfall also.



Rainfall of the Torrid Zone. Do the trade winds blow toward warmer or toward colder regions? Does this indicate that the trade-wind regions are dry, or rainy? As the trade winds advance over the oceans they grow warmer and thirstier, and evaporate so much water that the sea is more salty in these regions than elsewhere. How is the vapor chilled and condensed into rain in the equatorial calms? Over the Atlantic and Pacific oceans, this belt never moves far from the equator, and so much fresh water pours down as rain in that region that the sea there is less salty than in the trade-wind belts on either side. In which zones does most of the *land* receive a heavy or a moderately heavy rainfall? In which zones is the rainfall on the *land* less than moderate?

Over the land the equatorial rain belt shifts north and south through nearly the entire width of the torrid zone, and, as it passes, it gives a season of ample rains to the greater part of the land surface in the torrid zone. In the southern part of the zone the rainy season occurs in the January half of the year; but in the northern part, in the July half. Why? In the central parts of the zone there are apt to be two rainy seasons in the year—one when the rain belt sweeps northward in our spring, and another as it sweeps southward in our fall.

Where the vapor-bearing trade winds are forced to rise over highlands, a heavy rainfall results. Why? Compare the rain map (p. 26) with the map on p. 16, and give reasons for the heavy rainfall on the northeast and southeast coasts of South America; in the upper Amazon valley; on the west coast of Africa. When does the heavy rainfall occur in east Africa? In southern and southeastern Asia? Why do the East Indies have a heavy rainfall? Do the heat equator and equatorial rain belt ever reach the coast of South America near the southern tropic? (map, p. 25.) Are winds from the sea forced up the west slope of the highlands in that region? Why does that coast receive little rain?

Rainfall of the Temperate Zones. Do the prevailing winds of the temperate zones advance into warmer or into colder latitudes? These winds cool quite slowly. They start from the tropical calms as dry winds, and do not yield much rain until they are chilled either in cyclones or by rising over highlands. Thus highlands and cyclones are the rain producers of the temperate zones.

Compare the maps on pp. 26 and 16. Why do the northwest coast of North America and the southwest coast of South America receive abundant rainfall? Why is there little rainfall in the region east of these coasts? The eastern half of North America gets its rainfall by the cyclone winds from the Gulf of Mexico and the Atlantic. Western Europe gets its moderate rainfall chiefly from cyclones. Farther east the rainfall is light because the region is so far from the sea that the winds contain little vapor.

What is the general movement of the air in the tropical calm belts? What kind of weather prevails there? Can you tell why there is little

rain in regions near the tropics in north and south Africa, southwest Asia, Australia, and western North America?

Tests. Explain the existence of rainy or dry weather accompanying equatorial calms; trade winds; tropical calms; monsoons; the parts of a cyclone. Give effects of surface on rain distribution, with examples.

Supplemental Work. Read or recite "Rain in Summer," and "The Rainy Day," by Longfellow.

OCEAN CURRENTS.

In nearly every part of the sea there are slow movements, or *currents*, of the surface water. The currents move in the general directions of the prevailing winds, and are generally believed to be caused chiefly by them.

The trade winds drive the equatorial waters of all the oceans westward, while the prevailing westerly winds urge the sea water eastward in temperate latitudes; and thus on each side of the equator, in both the Atlantic and the Pacific Ocean, the water is thrown into a great whirl or eddy around the region of tropical calms. In what di-

rection do these whirls move on the side toward the equator? In what part of these oceans do they move away from the equator? In what part of the oceans do they move toward the equator?

A branch from the north Atlantic eddy follows the coast of Europe into the Arctic Ocean and sweeps around

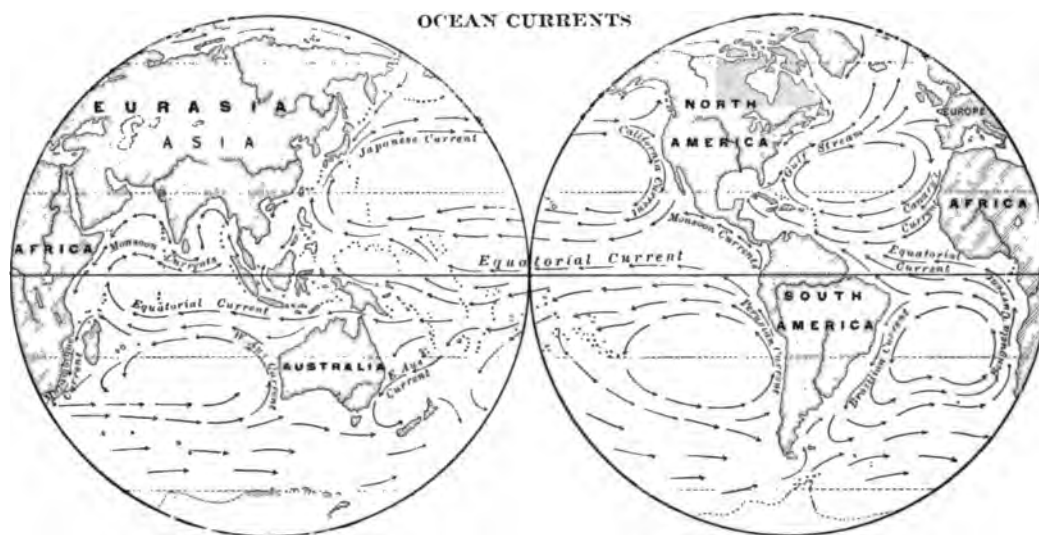
its basin, returning southward near the coast of Greenland.

South of the equator in the Indian Ocean, there is a great eddy similar to those in the south Atlantic and Pacific oceans, but north of the equator the currents of the Indian Ocean move generally eastward during half of the year, and generally westward during the other half. During which half do you think they move eastward?

Wherever the ocean eddies move *from* the equator their water is warmer than that of the surrounding ocean, and that part of the whirl is called a *warm current*; but that part of the whirl which moves *toward* the equator is a *cold current*, because it is cooler than the surrounding water.

Currents affect the climate of the neighboring coasts chiefly by warming or cooling the winds which blow from them to the coasts. Which coasts of the continents are most affected by the ocean currents in the temperate zones? Which in the torrid zone?

Names of Currents. Various parts of these great surface eddies of the oceans have been given special names. What is the part of all the great eddies called which moves west near the equator? What is the part of the north Atlantic eddy north of the West Indies called? This is because part of it appears to flow out of the Gulf of Mexico between Florida and Cuba. The narrowness of this channel makes the Gulf Stream here one of the most rapid of the ocean currents. Is it a warm or a cold current? What is the corresponding part of the north



Pacific eddy flowing past the Japanese Islands called? Its Japanese name is *Kuroshio*, or "Black Stream." Is it a warm or a cold current? What is the eastern part of the whirl in the north Pacific called? The eastern part of the south Pacific whirl? Are these warm or cool currents?

Tests. Name, describe, and explain the chief currents of the Atlantic Ocean; the Pacific; the Indian; the Antarctic. Explain the effect of ocean currents upon climate.

Supplemental Work. Using the maps on pp. 26 and 27, write a comparison of the climates of the eastern and western shores of the northern Pacific. Read Byron's "Address to the Ocean."

TOPICS ON DISTRIBUTION OF HEAT AND MOISTURE.

I. HEAT. Day and night: cause; differences in length. Seasons: causes; names; times. Zones: boundaries; names; modifications—by altitude, by land and water, by earth's position, by winds, by currents.

II. RAIN. Cause. Influence of winds: trade winds; prevailing westerlies; calms—equatorial, tropical; cyclones; monsoons. Influence of seasons. Effect of surface: mountains; land and water; plains.

LIFE.

DISTRIBUTION OF LIFE.

Plants and animals are found in nearly all parts of the world, but they are most abundant in warm, moist regions. Thus there is an irregular but gradual decrease in life forms from the moist equatorial lowlands toward the cold polar regions, and also toward the cold summits of high mountain ranges.

Dense Forests. In what zone are most of the dense forests? How great is the rainfall of these forest regions? This forest vegetation is wonderfully dense and luxuriant. The great trees stand close together, and are often covered and interlaced with hundreds of climbing vines and air plants. As there is no cold season, vegetation grows throughout the year and is always green. The leaves of the plants are very large, like those of the palms.



Dense equatorial forest.



Open Forests. In what zone are most of the open forests? How great is the rainfall of these forest regions? The forest vegetation of the temperate zones is much less dense and luxuriant than that of the torrid zone.

Only such plants live in the temperate zones as can ripen their fruit during the warm season. They either stop growing or die during the cold season.

Most of the broad-leaved trees, such as the oaks and maples, lose their leaves in autumn, while nearly all the evergreen trees have needle-like leaves, as the pines, or scale-like foliage, as the cedars.

The animals of these zones are adapted for the changing seasons by having heavier coats of hair, fur, or feathers in winter, and some of them lie dormant or asleep in sheltered places throughout the cold season.

Grassy Lands. Are there any grassy lands in the torrid and temperate zones? Are they mostly in regions of heavy or of light rainfall? In both zones, where the rainfall is too light or too unevenly distributed through the year for forests, it may yet be sufficient for a growth of grass, shrubs, and other low plants. In such places are found open grassy lands.

These are called *prairies*, *steppes*, *llanos*, and *pampas*, in different parts of the world. They are often very fertile, and when the rainfall is sufficient, make excellent farms. The animal life of these regions is different from that of the forests—for animals adapted to live on or among trees cannot secure food in open lands.

Tundras. In the frigid zones, it is so cold that comparatively few kinds of plants and animals can live. Throughout this region the soil is frozen to a great depth. Only its surface thaws in summer, and, as the water cannot sink through the frozen soil beneath, a wide strip of country along the Arctic coast of America and Eurasia is thus converted at that season into a great swamp, or *tundra*.

The life forms are specially adapted to live through the long winters. Most of the animals have coats of thick fur or coverings of fat to keep them warm. Though some kinds of flowering plants manage to blossom and fruit during the short summer, the vegetation consists mostly of mosses and lichens and a few dwarfed trees.



The giant cactus, Arizona.

Deserts. What besides warmth is necessary for plant life? A very dry region, even if it is warm, can have little or no vegetation. Such a region is a *desert*.

On the rainfall map (p. 26) find the warm regions having little rainfall. Compare these with the deserts on the vegetation map. Are there deserts in all the grand divisions? Where are the most extensive deserts?

The few plants of deserts are peculiarly adapted for a dry climate, having hard, close bark and small leaves through which their juices cannot evaporate easily. Many, like the cactus, are armed with thorns or spikes. These prevent plant-eating animals from touching the plants and breaking the bark which preserves the sap from evaporation. The animals, therefore, must be specially adapted to procure food in these dry regions.

Supplemental Work. Bring to school leaves of several varieties of evergreen and of broad-leaved trees growing in your own neighborhood. Mount them on cardboard and label them. Find out about the palm or the banana; its distribution, appearance, and use. Find out about the cactus, the maguay, the acacia, and their uses.

GREAT LIFE REGIONS.

Barriers. As there are differences in heat and moisture, so are there differences in the life forms of different regions, each form being specially fitted, or adapted, to the climate and other conditions of its own region. Animals are free to roam, birds to fly, and the seeds of plants are scattered far and wide by winds, currents, and animals; yet, sooner or later, both animals and seeds are likely to reach a region in which they are unfitted to live, and which thus acts as a natural *barrier* to their further diffusion.

The greatest natural barrier for land life is the sea, though a wide desert, or a high mountain chain, is quite as impassable to many animals and plants. But a barrier may consist simply of a difference in climate, the absence of proper food, or the presence of enemies which the animal or plant cannot withstand.

Great Life Regions. The deserts and the mountain ranges that lie between the torrid and north temperate heat belts, together with the sea, are such important barriers to the spread of animal and plant life that they may be taken to mark the division of the continental plateau into six great life regions. In each of these the plants and animals differ to a greater or less extent from those of all the other regions.

Name the six great life regions. What forms the barrier between the South American and the North American life region? Between the

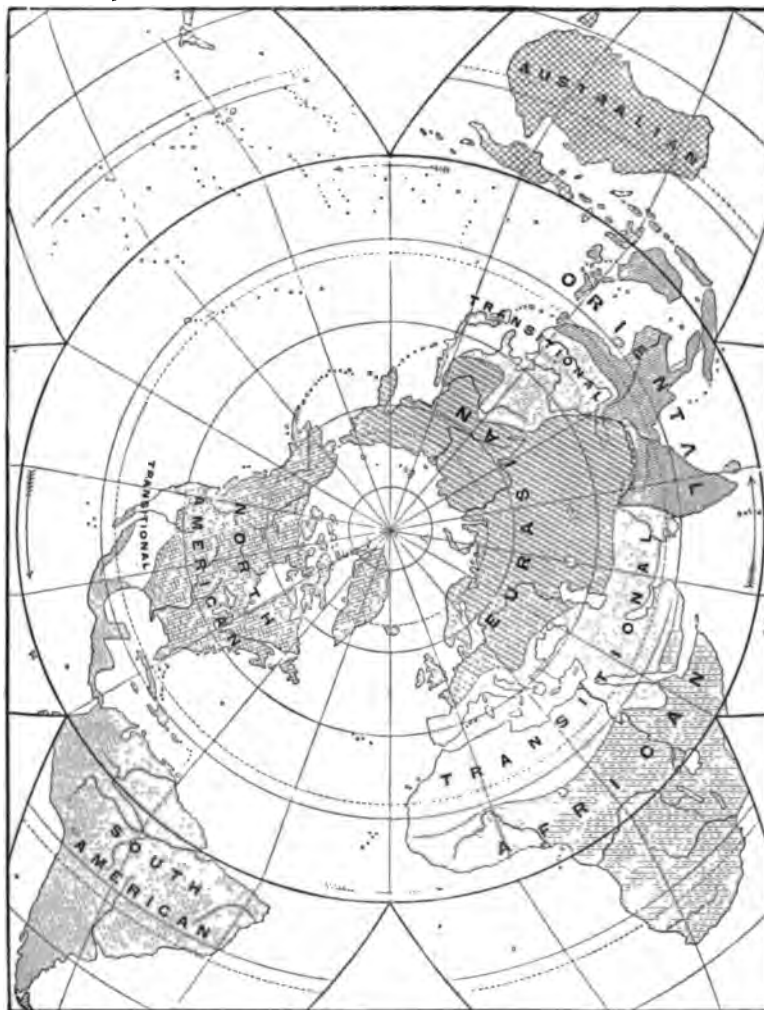
African and the Eurasian region? In these transitional regions life forms are found somewhat resembling some of those in the neighboring regions, but strangely changed and adapted to fit them to their dry surroundings. The barrier between the Eurasian and the Oriental region is the edge of the Eurasian highland. In the west it is sharply marked, for there the edge of the highland rises into the Himalaya Mountains, the loftiest range in the world. Farther east there is a broad transitional region, where the barrier is chiefly the difference in climate between the temperate and torrid heat belts. What is the barrier between the Oriental and Australian life regions?

Supplemental Work. Read "How Plants Travel" in Johonnot's "Glimpses of the Animate World," "Migration of Birds" in Lockwood's "Animal Memoirs," Part II.; Dana's "Plants and their Children."

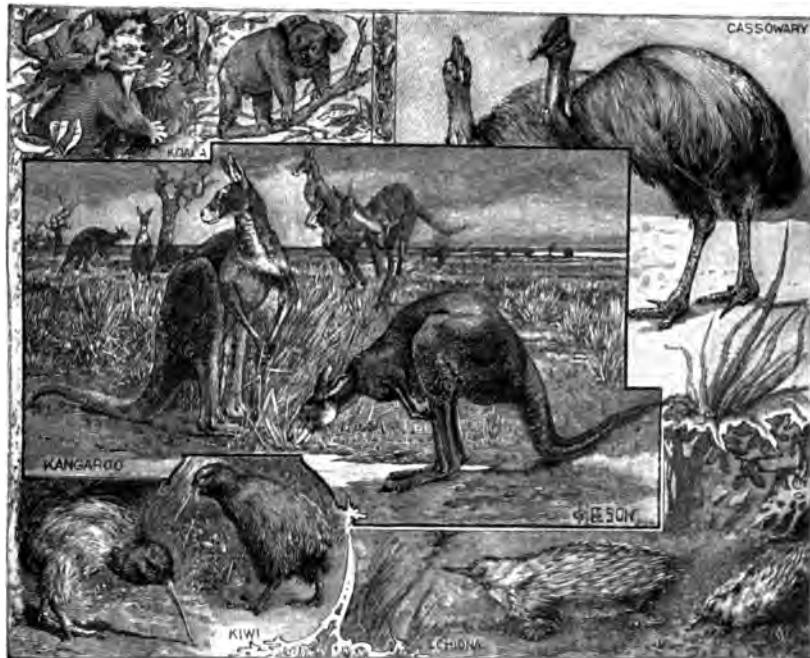
THE AUSTRALIAN REGION.

The Australian is the most peculiar of the life regions. Nearly all of the native four-footed animals either are hatched from eggs or are so helpless at birth that for some time they are carried in a pouch or fold of skin on the breast of the mother.

There are many kinds of such pouched animals. Many of them are of the kangaroo type; others, the koala and the Tasmanian devil, are bearlike animals about the size of a poodle dog; another, the Tasmanian wolf, is as big as a Newfoundland dog. Still others are somewhat like squirrels, rabbits, rats, mice, or moles in size and habits. The kangaroos are leapers, having short, weak fore legs and long, stout hind legs, upon which they squat upright and with which they leap over the ground. The largest kangaroo, when sitting upright, is as tall as a man, but some kinds are as small as rats.



Life regions.



Some animals of the Australian region.

The egg-laying mammals are the echidna, a kind of ant-eater having a beaklike snout and a body covered with thick spines; and the duckbill, which has a bill like a duck's, fur like a mole's, and webbed feet. The duckbill lives mostly in the water, making its burrow in the banks as a muskrat does. The echidna and the duckbill are each about as large as a terrier dog.

Among the birds are the large ostrichlike running birds — the emu, the cassowary and the kiwi; the brush turkeys, which do not sit on their eggs, but after heaping up great mounds of brush over them leave them to hatch themselves; the lyre bird, so named from the form of its tail; and the bower birds, which build a covered playground or bower which they decorate with shells or colored stones.

Among the more peculiar plants are the leafless she oak or beefwood trees; flowering but leafless acacia trees, which produce a bark excellent for tanning; and many kinds of eucalyptus trees. Some of these are among the tallest trees in the world; others are peculiar in having several forms of leaf on the same tree; and on many the leaves grow with their edges instead of their sides toward the sun. The tropical forests along the north coast contain many palms and other plants similar to those of southern Asia.

Recently man has introduced into Australia sheep, cattle, rabbits, and other kinds of animals. These thrive wonderfully, showing that other than pouched animals might have lived in this region had not some barrier prevented them from reaching it.

What Australian Life indicates. Egg-laying mammals are now found nowhere else in the world, and the opossums of America are the only pouched animals now found outside of the Australian region. Fossils, however, of such animals are found buried in the rocks of Eurasia, and it is supposed that ages ago they were the only kind of mammals in the world. At that time Australia is thought to have had a land connection with Eurasia and to have been stocked with these animals. Afterward it became separated from Eurasia by an impassable barrier of sea, thus preserving its ancient animal forms, while in the larger land masses these early animals were replaced by more highly organized descendants.

Supplemental Work. Bring to school a picture, an anecdote, or a description of one plant or animal peculiar to the Australian region. Write

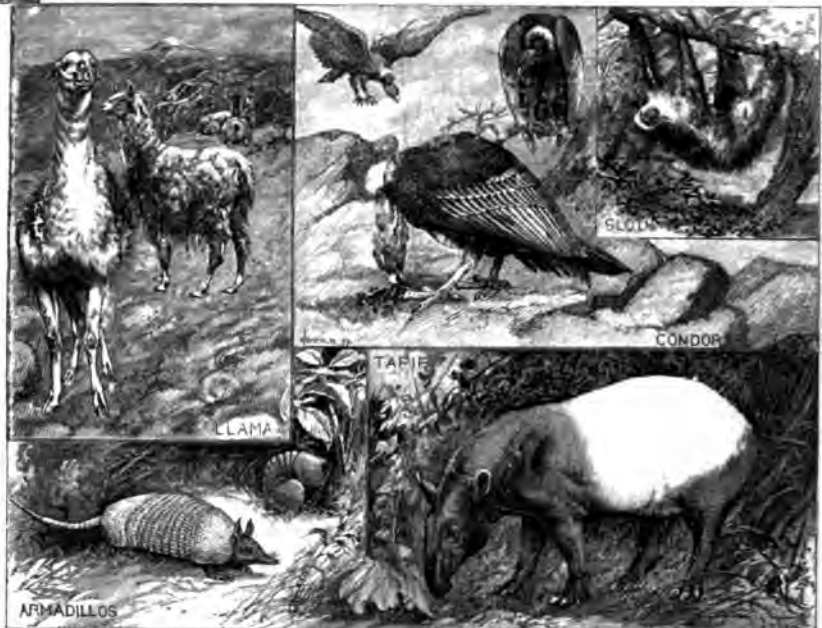
next day a reproduction of an anecdote or description brought by one of your schoolmates.

The Cyclopedia and books on natural history contain these descriptions, but you may find anecdotes and poems in the readers used in your school.

THE SOUTH AMERICAN, AFRICAN, AND ORIENTAL REGIONS.

The South American Region contains more kinds of plants and animals than any other region, and, next to the Australian, is the most peculiar. It is the home of many kinds of opossums. Some carry their young in a pouch, but in other kinds the pouch is not well developed, and the young ride on the mother's back as she climbs among the trees.

The sloth is a forest-loving animal that spends most of its life hanging by its long curved claws from the branches of trees. Tiny air plants growing from its fur give the animal a greenish color. The



Some animals of the South American region.

ant-eater has no teeth, but has a long, sticky tongue to which the ants adhere. The armadillos are burrowing animals often met with in the open plains. They are covered with a flexible horny armor, in which they roll themselves into a ball when frightened. This region is the home of the guinea pig, the tapir, the long-tailed monkey, the piglike peccary, and the jaguar, or American tiger. Several kinds of llamas live in the Andes and in the southern lowlands. These animals are related to the camel, and like it can live many days without water; they are trained as beasts of burden, and yield a wool or hair that is woven into cloth.

Among the birds are beautiful parrots and macaws, the condor of the Andes, — the largest of flying birds, — the ostrichlike rhea, and the curassow, which is related to the Australian brush turkey.

Among the peculiar plants of this region are the mahogany, rosewood, logwood, and cinchona or Peruvian-bark trees; plants yielding India rubber, the vanilla bean, and useful gums; palms, bananas, bamboos, and tree ferns. Cayenne pepper, the potato, the tomato, tobacco, and Indian corn are native in this region, but the coffee tree, sugar cane and wheat were brought to South America by man.

The African Region ranks next to the Australian and South American in peculiar plants and animals. It is specially noted for the great number of its flesh-eating animals — lions, leopards, panthers, hyenas, and jackals —

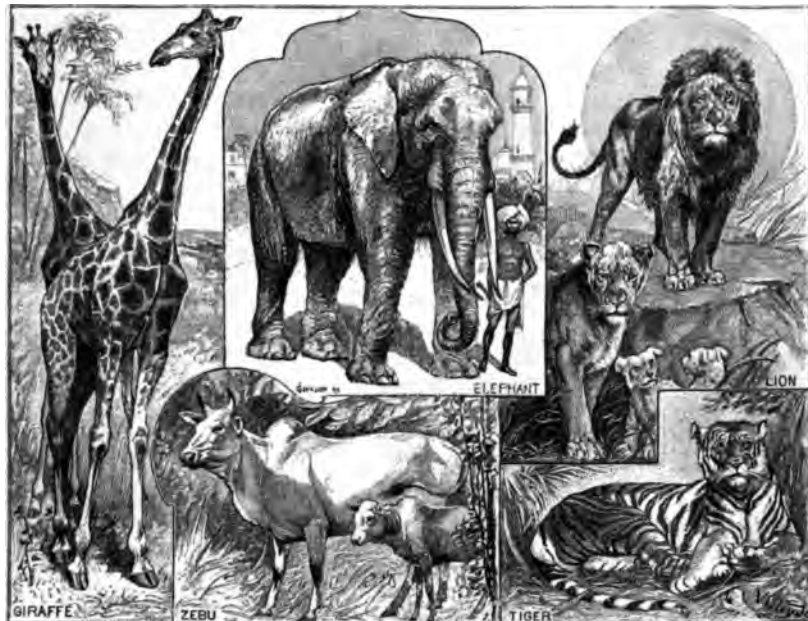
and for its hoofed animals, such as many antelopes, the Cape buffalo, the hippopotamus, the giraffe, the zebra, and the wild ass, from which the donkey is descended.

Besides these there are the elephant, the rhinoceros, and many monkeys, including the huge gorilla and the smaller chimpanzee, which are more like man than are any other animals.

Among the birds are the ostrich, the large secretary vulture, which is both a powerful runner and a flyer, guinea fowl, and the beautiful blue and copper-colored plantain eaters.

The plants include many palms, among them the oil palm and the date palm; and many acacias, most of them thorny shrubs growing in desert lands and yielding valuable gums, as gum arabic. The baobab is a peculiar tree of Africa; its spreading branches droop so that a single tree may resemble a whole grove. The coffee tree is a native of north-eastern Africa.

The Oriental Region is noted even more than the African for flesh-eating animals; besides the lion, leopard, and hyena, it has the tiger, the largest, strongest, and fiercest of the cat family. Like south Africa, too, this region has the elephant and the rhinoceros, and herds of wild buffalo, some of which are domesticated as beasts of burden. An-



Some animals of the African and Oriental regions.

other domestic animal, the zebu, is much like our cattle, but has a hump over its shoulders.

There are bears in this region, and several kinds of deer, wild cattle and wild swine, and tapirs, much like those found in South America. This is the home of true mice and squirrels, and of several kinds of monkeys, including the manlike orang-outang.

Among the birds are the beautiful little bulbul, which the natives train to fight, and many kinds of pheasants, including the peacock and the jungle fowl, from which our chickens are descended.

The plants include cedars, yews, pines, and oaks along the slopes of the Himalayas, but in the hot lowland forests are many spice-yielding plants, bamboos, palms, and fine hard woods and cabinet woods, as teak, ebony, satinwood, and sandalwood.

What South American, African, and Oriental Life indicates. For ages after Australia had become permanently separated from Eurasia, the present barriers to the north of South America, Africa, and southeast Asia did not exist, and most of the kinds of animals now found only in those regions lived also in North America

and Eurasia. Their fossil remains are now found in the rocks of those grand divisions, above the fossils of the pouched animals. Then, by changes of climate or the slow movements of the earth's crust, the barriers came into existence and shut off the life of South America, and Africa, and southeast Asia from the large land mass to the north, where these animals gradually perished and were replaced by more highly organized descendants.

Supplemental Work. Bring to school a picture, an anecdote, or a description of one animal and one plant belonging to each of these regions. Write next day a reproduction of the anecdote or the description given by some other pupil.

THE EURASIAN AND NORTH AMERICAN REGIONS.

The Eurasian and North American regions differ from each other less than any other two regions. It is remarkable that the plants and animals of two such large regions, separated by the cold Arctic climate and a sea barrier, should be so similar. Yet the native life forms of the two regions are seldom exactly alike, and in some instances are quite different.

In both regions are found bears, wild cats, wolves, foxes, deer, beavers, and squirrels. The white polar bear and the black bear are the same in the two regions, while the fierce Rocky Mountain grizzly bear is much the same as the European brown bear. The reindeer that is trained to draw sledges over the Arctic snows of Eurasia is practically the same as the wild caribou which is hunted for food in the region near Hudson Bay. The European elk is the same as the American moose. The Rocky Mountain goat and the bighorn sheep are cousins of nineteen or twenty kinds of wild goats and sheep, including the ibex and chamois, of Eurasia; even the American bison (buffalo) and musk ox are close kin to wild cattle found in Eurasia.

Yet the puma, skunk, raccoon, prong-horned antelope, muskrat, prairie dog, otter, and opossum are found only in America, while wild boars, camels, and wild horses are found only in Eurasia, for the ancestors of the horses in America were introduced by man.

Eagles, owls, hawks, crows, and wrens are found in both regions, but wild turkeys, buzzards, blue jays, orioles, mocking birds, and humming birds are American, while vultures, pheasants, true partridges, starlings, magpies, and nightingales are peculiar to Eurasia.



Some animals of the Eurasian and North American regions.

These regions are both noted for the great number of cone-bearing trees, as the pines, spruces, firs, hemlocks, and cedars; and for such trees as the oak, chestnut, beech, ash, elm, sycamore, walnut, maple, birch, and willow; as well as for the gentian, rush, and primrose.

America is peculiar in its golden rod and asters, the bald cypress trees, and the great sequoias and redwoods of the Pacific slope. Eurasia has a greater number of heathers, roses, and the olive and almond trees.

What North American and Eurasian Life indicates.

The similarity in life forms indicates that the present barriers between the North American and Eurasian regions have existed for a comparatively short time, and that they are not now so effectual as the barriers between these and the other regions.

The present life forms of North America and Eurasia are highly organized, but in the rocks there are found fossils of forms which are less



An extinct tapirlike animal of North America.

highly organized and are more like those now living in the other regions. This indicates that the life forms now found in North America and Eurasia are the youngest, or most recent, in the world. They are the descendants of the older fossil forms which used to live there. The conditions of life changed rapidly in these regions, and the life forms changed with them until they gradually assumed their present form, which differs greatly from that of their ancestors. In other regions the conditions changed more slowly, and the present life forms in those regions (especially in Australia) are more like their remote ancestors.

Domestic Animals and Cultivated Plants are descendants of wild ones, but, under the care of man, many of them have changed so greatly that it is now hard to tell from which of the wild animals and plants they descended. As Eurasia seems always to have been the home of by far the greater part of mankind, it is not surprising that most of our domestic animals and cultivated plants are descended from wild animals and plants of that grand division.

Supplemental Work. Bring to school a picture, an anecdote, a specimen, or a description of some plant or animal of the North American region, and of some plant or animal of the Eurasian region. Write next day a reproduction of some other pupil's anecdote or description.

ISLAND AND OCEAN LIFE.

Continental Islands are usually close to the mainland, and many of them have not long been separated from it;

hence their plants and animals are generally quite similar to those of the neighboring continent.

The Oceanic Islands also have received their life forms from the continents, but they contain chiefly birds which can fly long distances, and such forms of life as have seeds or eggs which can be easily transported. Some of these are so light that they will float or can be carried by the winds. Some are carried in the stomachs of birds, or attached to the mud on their feet.

Most of these forms of island life have some resemblance to kinds found in the continent from which the prevailing winds or currents move toward the islands.

Ocean Life. Many warm-blooded animals, such as whales, porpoises, seals, and walruses, live during a part or all of the time in the sea, but have to come to the surface to breathe. In addition to these there are hosts of true fishes that can live and breathe under water, as sharks and mackerel and codfish, besides hundreds of kinds of shellfish, as oysters and lobsters. The sea also contains thousands of lower forms of animal life, such as jellyfishes, sponges, and coral polyps; and many kinds of seaweed and other marine vegetation.

Light penetrates the ocean to a comparatively slight depth, and all the water there, except a thin surface layer, is almost as cold as ice; hence vegetable life in the ocean is most plentiful near the surface, and especially in the shallow waters near the continents. As food is thus abundant, animal life also is most plentiful in these regions, though a few kinds of marine animals live near the bottom of the deepest parts of the sea.

Supplemental Work. Read "Animal Life in Madagascar" in *Johannot's "Flyers, Creepers, and Swimmers,"* and Parts III. and IV. of *Johannot's "Glimpses of the Animate World."*

TOPICS ON DISTRIBUTION OF LIFE.

I. **NUMBER OF LIFE FORMS.** Effect of climate on; resulting distribution.

II. **KINDS OF LIFE.** Forests: equatorial—trees, animal inhabitants; temperate—trees, animal inhabitants. Open lands: grassy lands—cause, distribution, life; tundras—cause, distribution; deserts—cause, distribution, forms of life.

III. **MEANS OF DISTRIBUTION.** Without man's aid. With man's aid.

IV. **BARRIERS.** What they are. What they cause.

V. **LIFE REGIONS.** Continental plateau: central regions—common forms, peculiar forms, present barriers; outlying regions—number, order in peculiarity of forms, chief forms of each; islands. Oceanic region: island forms; marine forms.

MAN.

RACES OF MEN.

Distribution of Mankind. In some respects man is like other animals. Like them, he must have air to breathe, a certain amount of heat, water to drink, and food to eat. But he is vastly superior to them all in *intelligence*.



The mammoth, an extinct North American elephant.



His intelligence has taught him how to start a fire, so as to warm himself when he is cold; to make tools with which to fashion clothing and a shelter to protect himself from the weather; and to make weapons with which to secure food. His intelligence also gives him the foresight to lay up food in summer for use during the winter, or to carry food with him when he travels to regions that do not supply it. Hence the natural barriers to other forms of life are not

in color. Most of the people have pinkish-white skin, though some are quite dark. This race includes nearly half the people in the world, and is the most civilized of all the races.

The principal division of this race is the *Mediterranean* type, to which we belong. The home of this type is the shores of the Mediterranean Sea, western Europe, and southern Asia as far east as the mouth of the Ganges.

The two principal peoples of this type are the *Aryans*, embracing the Hindus and the Persians of southern Asia, and most Europeans, together with their descendants in all parts of the world; — and the *Semitic* people, embracing the Jews, Arabs, and Berbers south and southeast of the Med-

iterranean Sea, together with their descendants. The Aryan people are rapidly increasing in numbers. In recent times thousands of them have left Europe to found homes for themselves in each of the other grand divisions, and these new settlers have practically taken possession of North and South America and of Australia, and are rapidly taking possession of Africa.

Yellow Race. The home of the yellow race is northern and eastern Eurasia, America, and most of the islands of the Pacific. The hair is straight, coarse, and black, and the skin yellowish or yellowish-red. The people of the yellow race are about as numerous as those of the white race, but they are not so highly civilized.

The principal, and by far the most numerous, type of this race is the *Mongolian*, the people of which, in addition to the yellow skin, are distinguished by narrow, almond-shaped eyes. This type occupies nearly the whole of northern, central, and eastern Asia.



Aryan people.

great barriers to man. Men live in nearly all the lands of the earth, from the torrid to the frigid zones.

It is believed that many ages ago men gradually wandered away in various directions from some central region, and made homes for themselves in new lands and thus peopled the earth. The people who wandered to different parts of the earth found very different surroundings, to which their descendants gradually adapted themselves, just as the descendants of plants and animals gradually change and adapt themselves to changing conditions of life. Thus would arise different *races* and *types* of men, in each of which the people resemble one another in manners and customs, and, in a general way, in appearance, while they differ more or less in these particulars from the people of other races and types.

Races. Mankind may be divided into three principal races, in each of which the people resemble one another somewhat in color of the skin and in the kind of hair. These three races may be called the *white* race, the *yellow* race, and the *black* race.

White Race. The home of the white or "Caucasian" race is Europe, southwestern Asia, and northern Africa. The people have wavy hair, which may be light or dark



American Indians (Apaches).

The *Malays* form a second type of this race. They are often called the *brown* race because they have brownish-yellow skin. In the main they are fierce and warlike, and much less civilized than the Mongolians. They live in extreme southeastern Asia, in the East Indies, and in the islands of the Pacific Ocean.

The third type of this race consists of the *American Indians*, including the *Eskimos*. They



Chinese girl.

are sometimes said to form the *red race* because of their reddish-yellow or copper-colored skin. They are not so numerous as the Malays, but they occupied nearly the whole of the American continent before it was settled by whites. Many of them were savages, though some tribes in the western highlands of both North and South America were much more advanced.

Black Race. The home of the black race is central and southern Africa and some of the Australian islands. The people of this race have coarse woolly or kinky hair, protruding lips, and dark brown or black skin. The black race includes about one tenth of the people in the world, and is the least civilized of all the races.

The *negroes*, whose home is central Africa, form the principal type of this race, while the small *Papuan* type includes the savages of New Guinea and some other Australian islands. The natives of Australia itself have black skin but straight hair, and by some are called a separate race.



Natives of Kaffraria, South Africa.

nents, but the population is so sparse that they do not contain so many people as live in the two little island groups, the one east, and the other west of Eurasia. Compare this population map with the rainfall map (p. 26), and tell why some of these thinly peopled regions are not fitted for a dense population.

MAN'S CULTURE.

The Progress of Man. Man is constantly learning how to make things and to do things which enable him to live more comfortably.

We have many conveniences nowadays, such as the electric light, railroads, sewing machines, and hundreds of other common things, which were entirely unknown when our grandparents were children. Name several others. A few hundred years ago the art of printing was unknown; the only books which then existed were written by

hand, and comparatively few people knew how to read. Some of these old books were histories, from which we learn how people lived at that time. A few thousand years ago no one in the world had yet learned how to write, and we know very little of how people then lived, since they left no written record of anything. Still it is certain that people lived long before that, because in rock deposits that are many thousands of years old, we find things that must have been made by men, such as stone arrowheads, stone axes, bits of pottery, and pieces of reindeer horn with rude pictures scratched on them.

Savagery. We therefore conclude that at one time, many thousands of years ago, all, or nearly all, people were more ignorant than the most savage tribes now living.

They probably did not know how to make anything, but lived in caves, wore no clothing, and ate only fruits, nuts, roots, and such insects as they could catch, and such small animals as they could kill with clubs and stones. At last some one may have learned how to tie a sharp stone on the end of a stick, and thus make a spear with which to spear fish or kill animals. Then some one may have learned that sticks rubbed together will get hot and at last burn, thus starting a fire. The most ignorant tribes in Australia to-day do not know how to do much more than this. Gradually some of the early men invented bows and arrows, discovered how to chip stones rudely into shape for arrowheads and axes, and learned how to make a canoe by hollowing out a log with fire and stone scrapers.

DENSITY OF POPULATION.

Although people are found in nearly all parts of the world, very many more live in some parts than in others. A region very thickly peopled is said to have *great density of population*.

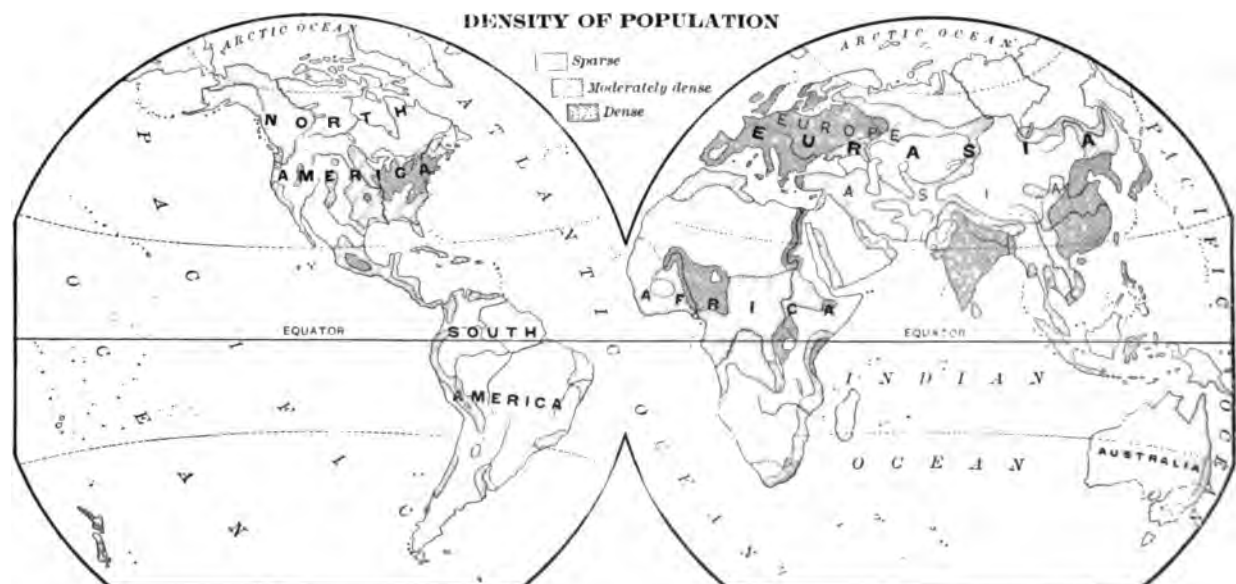
In other regions one might travel for hundreds or even thousands of miles, seldom, if ever, seeing a human being or any sign that people lived there. Such a region is said to be thinly peopled, or to have a *sparse population*.

On this map the most thickly peopled regions are shown by the darkest lining; the regions of moderate density of population, by the lighter lining; and the most thinly peopled regions, by dots.

In which grand division are the largest regions of very dense population? In what part of the grand division is each? What type lives in each? These regions do not form a large part of the continental plateau, yet they are so densely populated that they contain about two thirds of the people in the world!

In which two grand divisions are the largest regions of moderately dense population? To what types do the people of these regions in Eurasia belong? To what type do the people in central Africa belong? Where is the largest region of moderately dense population in the western hemisphere? This is the eastern half of our own country. Nearly all the regions of dense and moderately dense population in North and South America, Australia, and southern Africa are occupied chiefly by Aryan people whose ancestors went there from Europe to live within the last hundred years.

What part of North America is very thinly peopled? What part of South America; of Eurasia; of Africa; of Australia? These regions together include more than half of all the conti-



Each of these discoveries enabled people to live more comfortably than before. People who have not learned how to do much more than this are *savages*.

Some tribes in Africa, and some of the most ignorant tribes of the American Indians, are scarcely more advanced than this to-day.

Barbarism. The next important step in the progress of man seems to have been the learning how to make rude pottery, by roughly shaping bowls and other vessels of soft clay, and baking them hard by fire. In Eurasia, where there were wild horses and many kinds of wild cattle, sheep, and goats, men gradually learned how to tame and domesticate these animals, and to cultivate several kinds of grain; while in America men learned how to plant and raise corn, which is perhaps the easiest of all grains to cultivate.

With their increasing knowledge the more advanced races gradually learned how to improve their tools and weapons. They smoothed and

Nearly all the Indians who lived in the eastern part of North America when it was first visited by white men knew how to make pottery and to cultivate corn, while some of the Indians living in the western highlands had advanced nearly through the highest stage of barbarism.

Civilization. When men at last learned to write, and were thus able to leave records of what they did and thought, they had advanced to a stage that may be called the beginning of *civilization*.

The greater part of the Mongolian type have reached the beginning of civilization, but have not progressed far beyond it. The greater part of the Mediterranean type, and especially its great Aryan branch, have continued to improve, and are still making inventions and discoveries; and these people form the enlightened nations of to-day. The knowledge of the arts of navigation, of printing, of architecture, the discoveries of nature's laws, and the application of steam and electricity to the needs of man, mark the highest stage to which he has advanced. Mention any other discoveries which belong to the age of civilization.

About 500 years before Christ.



About the time of Christ.



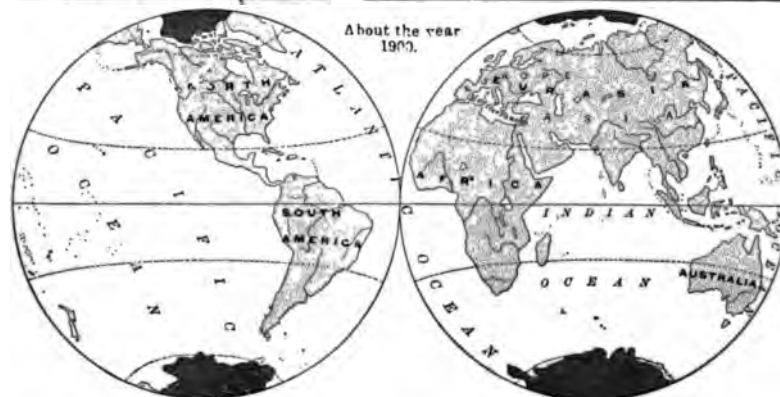
About the year 500.



About the year 1000.



About the year 1500.



About the year 1900.

The progress of geographical discovery; the darkest tint indicates unknown regions.

polished their rough stone arrowheads and spearheads and axes, made fishhooks of bone, and rough needles with which they could sew together the skins of animals for clothing. Then some one found copper in the earth and discovered that it was soft enough to be hammered into the proper shape for ornaments, while some one else found tin and discovered that both tin and copper would melt, and when melted together would cool into a very hard metal (bronze). Out of this metal the people molded tools that were a great improvement on their old stone and bone implements. With these tools they learned to quarry and roughly to shape stone to make houses, while some one else learned how to make bricks from clay. They also twisted the stringy fibers of plants into rude threads and wove them into a coarse cloth. Finally, those interested in working metals found out how to get iron from the minerals, or *ores*, in which it is found in the earth, and soon learned some of the many uses of this metal.

Though no one in the world had yet learned how to write, and hence every one was ignorant in comparison with the people we know, still the people who knew how to do some or all of these things could live much more comfortably than the savage tribes.

People who have advanced far enough to make pottery, to have domestic animals or some cultivated plants, and to know something of the use of the metals, but who have not yet learned to write, are said to be in the condition of *barbarism*. Very many of the negro tribes of Africa and the Mongolian tribes of northern Asia are barbarians to-day.

The maps above indicate the gradual growth of man's knowledge of the world after he became civilized enough to leave a record of what he knew upon the subject. From the first map tell in what part of the world man first became civilized enough to leave such a record. What parts of the world next became known to civilized man? What great geographical discovery was made about 400 years ago? Why are the later maps surrounded by circles, while the earlier ones are not? What part of the world is still unknown?

Supplementary Work. Bring to school, or describe, any implements or utensils used in your ancestors' time, and tell what improvements have been made since then. Bring to the school collection any stone spearheads, arrowheads, pipes, or other stone implements which you or your friends may have found in the fields near your home. Read chapter 14 of "McMaster's School History of the United States."

GOVERNMENT AND RELIGION.

Government. In the earlier stages of human progress, when men owned but little property and so could own it in common, there was no necessity for government as we know it. In time of war the ablest warriors were chosen as chiefs to lead the various war parties, and in times of peace the older men and women gave counsel to the others.

In Eurasia, however, man gradually became civilized, and, because of his greater knowledge, was able to accumulate flocks and herds and other valuable property. Then disputes arose as to the ownership of the property, and it was seized by the strongest and shrewdest men, who made the weaker people serve them. Thus, in many parts of Europe, the people were divided into two classes: the rich and powerful families, or *aristocrats*, who made all the laws, and the great mass of poor people, who at last came to think that the aristocrats were nobles born to rule.

The strongest of the nobles finally claimed to be the *king*, or *monarch*, of a great region surrounding his home, and to own all the land and the people living on it; but he gave parts of the region to the weaker nobles living in it, on condition that they should help him in war and acknowledge that he, and one of his family after his death, should be monarch. Thus *monarchies* were established in many parts of Eurasia.

Monarchies. For many years monarchies were *absolute*, or *despotic*; that is, the monarch, with perhaps a few nobles to advise him, made all the laws and could put any of his subjects to death at his pleasure. Absolute monarchies still exist in some parts of Eurasia. In other parts, the people gradually became so civilized that they learned how to take some of the power away from the monarch. In such countries the laws are made by a body of men, composed partly of nobles and partly of men chosen from the common people, while the monarch can only approve or disapprove of the laws thus made. Such are the governments of most of the countries of Europe to-day. They are called *limited* or *constitutional monarchies*.

Republics. In some countries, when the common people became strong and civilized, they decided to take all the powers of government into their own hands and to do away entirely with the monarch and nobles who held office because of their birth. In such countries the people elect a body of men to make the laws, and a chief officer, or *president*, to see that the laws are executed. These men hold office only a few years, and then others are chosen to succeed them. Such a government is called a *republic*. Our own government and most of the other governments established by white men in America, as well as a few of the governments of Europe, are of this form.

Religions. The *Jewish* religion was proclaimed by Abraham in southern Asia about four thousand years ago. The Jews believe in one God and in the Old Testament.

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Christianity teaches that Jesus Christ is the Son of God, and the Savior of mankind. Christians believe in one God and in the Holy Bible. This is the prevailing religion in Europe, America,

and the other more highly civilized parts of the world. About one fourth of mankind profess Christianity. The chief divisions are the Catholic, the Greek Orthodox, and the Protestant churches.

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The more ignorant tribes of men are *pagans*. They believe in many gods or spirits, and worship them, or idols representing them. There are about as many pagans as Brahmanists.

INDUSTRIES.

A savage has comparatively few wants, and nearly all the things he needs are supplied by the labor of his own hands. He makes the rude tools and weapons with which he procures raw materials, out of which he prepares his food, clothing, and shelter.

When man has advanced to the stage of barbarism, he has learned to want more and better things, a more certain supply of food, better clothing, and more perfect shelter. To supply these things better tools and implements are necessary. Hence some of the people devote much of their time to making tools, others to procuring food, and others still

St. Basil's, Moscow.



St. Paul's, London.



St. Peter's, Rome.

to some other industry, while each exchanges the result of his labor for the needful things produced by others. By such *division of labor* each one learns to do his own special kind of work better than it could otherwise be done. But in the stage of barbarism, as in savagery, men's wants do not extend much beyond the things that can be supplied from their own neighborhood.

As man advances in civilization, however, his wants increase very greatly, and as he has learned how to make roads, and ships, and railroads, he has come to depend upon nearly all parts of the world to supply his needs. As the wants of civilized man have increased, so has the division of labor by which they are satisfied. Gradually it has come about that each person more and more confines himself to a single kind of work or occupation, depending more and more upon those who do other kinds of work to supply his own different wants. Thus very many different occupations, or industries, have grown up wherever civilized man lives.

The production of raw material for food, clothing, and shelter gives rise to five great industries:—agriculture, herding, fishing, lumbering, and mining. The fitting of raw material for use gives rise to the industry of manufacturing; the distribution of raw material and of the manufactured product gives rise to the industry of commerce, or trade and transportation. In these seven industries the greater part of civilized mankind finds occupation and earns a livelihood.

AGRICULTURE.

The work of tilling the soil and raising plants for the use of man is called *agriculture*. It is the most important of all industries, and gives occupation to about one fourth of the civilized workers of the world.

The preparation of the soil is important. If the land is too wet it must be *drained*, or the roots of the plants will decay. If it is too dry during the growing season, the water from the better-supplied regions may be led to it by ditches, or the rain which falls at other seasons may be stored in reservoirs to be used when needed. The watering of land in this way is called *irrigation*. Some of the most productive parts of southern Asia and the western United States are made fertile by irrigation.

Plants draw a part of their food from the ground through their roots, but all plants do not require the same kind of food. To prevent the soil of a field from becoming exhausted and poor, farmers plant, in successive years, crops which draw different materials from the ground. This is called the *rotation of crops*. Sometimes, instead of rotating crops, there is added to the soil plant food of the same kind as the crops have taken away. The materials added are called *fertilizers*. In parts of Europe, where the land has been cultivated for hundreds of years, a



An irrigating canal in the California valley.

great deal of fertilizing material is used, but in many parts of the United States, where land is as yet plentiful and cheap, men have found it cheaper to use new land than to preserve the old by fertilizing.

Many of the best farming lands of the world are in the plains drained by the great rivers of the temperate regions; but wherever there is soil watered and heated sufficiently for plants to grow, food is raised if there is a good market within reach. The crops from the farms must be transported to places where food materials are not produced, and yet where there are many people to be fed. Garden vegetables and many kinds of fruit are grown in the neighborhood of cities, for transportation over long distances is difficult and expensive.

Cultivated Plants. The chief food plants store nourishment in their seeds and are called *grains*. Of these, wheat, rice, corn, rye, oats, and barley are the most important.

Wheat forms the chief food of the people of America and western Europe. It grows best in a rather cool climate, and hence is extensively cultivated in the lowlands of the temperate zones, both north and south, but it also grows well in the highlands of the torrid zone. Why? It thus happens that a crop of this important food is ripening in some part of the earth during every month of the year.

Rice is raised in rather warm climates, and chiefly in localities that can be easily flooded.

Corn, though a tropical plant, grows very rapidly and thrives well wherever the weather is hot and moist during its short growing season. It is one of the chief foods both of man and of the domestic animals.



Wheat harvesting on the Central Lowland of the United States.

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Rye, oats, and barley are cultivated in the cool parts of nearly all countries in the temperate zones.

Some plants store nourishment in their underground stems or in their roots. The potato is a kind of underground stem, but the beet is a root. Both belong to temperate climates, and both are used directly as food, but from the beet sugar is also made. About half of the sugar used in the world is made from the beet. The other great sugar-producing plant is the sugar cane, a kind of grass which looks like Indian corn. It requires a hot, moist climate.

Of fruits, the apple is the most important of the temperate zone, since it can easily be kept throughout the winter. Grapes are very widely distributed; oranges and lemons are raised in the warm parts of the temperate regions. Bananas and dates form the chief food of man in some tropical countries.

Tea is grown only in the temperate parts of the eastern hemisphere, while *coffee* is a native of the tropical climate and is cultivated in both

The most useful draught and pack animals in different parts of the world are the horse, the camel, the donkey, the elephant, the ox, the llama, and the reindeer, though the dog is used in the northern part of North America to drag sledges, and in many parts of Eurasia to draw little wagons.

The chief use which man makes of animals, however, is for food. Cattle, hogs, sheep, and poultry supply most of the animal food used in the world.

Cattle are the most important food animals. They are raised in great numbers to supply milk, butter, cheese, and beef. Pork is not so wholesome as either beef or mutton, but it is more easily preserved; hence hogs are raised in enormous numbers, especially in regions where corn can be grown to feed them, and in forest regions where they can feed on the wild nuts, or *mast*.

The meat of these animals is eaten fresh or is preserved for use by curing; that is, by salting or smoking. A great deal of meat is canned, as are also soups and meat extracts. Live cattle and sheep are sent immense distances on cars or in cattle ships, or the fresh meat is shipped in iced chambers.

Poultry are raised in great numbers in nearly all civilized countries, not only for food but also for their eggs. Both the live fowls and their eggs are articles of export from many countries.

Sheep and goats are raised chiefly for their wool or hair, which is con-



Cattle herding on the Great Plains, Montana.

hemispheres. *Tobacco* grows well in the warmer parts of the temperate zones where there is an ample rainfall. Our own country produces about one half of the tobacco of the world.

Fibers. Cotton is the most important plant cultivated for other purposes than food. From this plant is obtained a fiber of which is made the most widely used cloth in the world. The cotton regions of the world lie in the moist lowlands of the temperate regions. Flax, from which linen is made and linseed oil is obtained; and hemp and jute, from which rope and cordage are manufactured, are also fiber plants. They grow in both warm and cool countries.

Supplemental Work. Bring specimens of useful plants to school to form a collection. Bring to school a description of one grain, or root, or fruit, used by man as a food; of one useful plant not used for food. Write, next day, a reproduction of one description given by a schoolmate. Read or recite "Ode for an Agricultural Celebration," or "Planting of the Apple Tree," by Bryant; and "The Huskers," by Whittier.

HERDING.

Man has domesticated such animals chiefly as are useful as beasts of burden or serve to supply him with material for food and clothing. Name some such animals. Can you think of some domestic animals not useful in these ways? How are they useful?

The raising and breeding of domestic animals is closely associated with farming and nearly every farmer pursues this industry also to supply the needs of his own family. In many parts of the world, however, especially in the drier parts of the open grassy regions, where the rainfall is not sufficient for successful farming, the herding of horses, cattle, and sheep is the chief occupation.



Hog raising in the Central Lowland, Illinois.

verted into clothing; but their flesh is also eaten. The alpaca, which yields a long, fine wool, is kept in large herds in the Andes Mountains, and in some parts of the world the hair of the camel is used in making coarse shawls and carpets.

As men have grown more civilized they have learned to make greater use of animal products. The skins of domestic animals are made into leather. Bones, horns, and hoofs are used in making combs, buttons, knife handles, and glue. The hair of cattle and refuse wool are used in making felt, and the bristles of the hog in making brushes. What use is made of down and feathers? Name some other uses of animal products.

Supplemental Work. Supply to the school collection such animal products as you can obtain. Bring to school an account of one domestic animal, describing it, and telling where and how it is raised, and what are its uses. Write, next day, a reproduction of the account given by one of your schoolmates. Read or recite "The Drovers," by Whittier.

FISHING.

The most valuable fishing grounds of the world are the shallow parts of the sea near the shores of the continents. in the north temperate zone.

MINING.

Mining is the getting of minerals out of the earth. In all parts of the world peopled by the white race, this industry has increased more rapidly in recent years than any of the other great industries, except that of trade and transportation.

The most useful minerals are coal, iron, petroleum, copper, gold, silver, tin, lead, zinc, and building stones.



Anthracite coal mine, Pennsylvania.

Coal. The most important branch of this industry is the mining of coal, which is extensively used for fuel, and for making illuminating gas. Coal is found in all the grand divisions, but by far the greater part is mined in western Europe and eastern North America.

How is coal formed? (p. 22.) In some places the coal beds crop out at the sides of a valley, and the coal is mined by blasting tunnels right into the bed; but in many places the coal can be reached only by sinking a deep hole, or shaft, down to it from the earth's surface. From the bottom of the shaft, parallel and cross tunnels are made in the coal bed, and then the coal between the tunnels is taken out. Railroad tracks are laid in the mines, and on them trains of cars dragged by mules, or sometimes by electric engines, carry the coal to the mouth of the mine, or to the foot of the shaft, up which it must be hoisted to the surface.

The mines are perfectly dark, and the miners are lighted about their work by little lamps attached to their caps. Gases which may escape into the mine from seams in the coal are sometimes ignited by these lamps. A terrible explosion follows, and hundreds of poor miners may be suffocated or buried alive by the falling roof of the mine. Mines are nearly always rendered damp by the ground water which runs into them. This must be drained off through a tunnel, or pumped out up the shaft. It is difficult to ventilate deep mines, and a current of fresh air must often be forced down the shaft by fans run by machinery.

Iron. After coal, the most important product of the mining industry is iron. Like most of the other metals, iron is not found pure, but is combined with other substances, forming *ore*.

The ore is put into great furnaces with coal, coke, or charcoal. The burning of this fuel melts the ore, and the

metal iron, set free, then flows off nearly pure. A substance called a *flux* is generally added to make the molten ore more liquid. This process is called *smelting*.

Iron ore is found in nearly every country, but those mines which are most convenient to coal have been most worked; hence the great iron-mining regions of the world are usually in or near the great coal-mining regions.

Iron ore is often found close beneath the surface of the ground, where it is collected by pick, shovel, and scraper; but iron ore, as well as the ores of the other metals, is also mined underground in much the same manner as coal is mined.

Of all the metals, iron is the most useful. It can be molded and hammered into any shape; it can be drawn into fine wire, or rolled into thin sheets; it can be made so soft that a pin will scratch it, or, in the form of steel, so hard that it will cut glass. Make a list of ten uses to which iron and steel are put.

Gold and Silver are much scarcer than many of the more useful metals. They do not wear away by rusting, as most metals do, and one or both of them are used as money throughout the civilized world. Both metals are usually found in veins in very old rocks, or in volcanic rocks of mountain regions. How are these veins formed? (p. 15.)

The rock bearing the gold is crushed to the finest powder in a "stamp mill," and the powder is then washed with water containing a substance which extracts all the gold, but leaves the rock.

Fine pieces of gold, or "gold dust," are also found in the detritus of gold-bearing rock, from which they may be separated by washing and sometimes by collecting on quicksilver.

Stone is obtained in all parts of the world, either from the detritus or from quarries opened in the solid



Gold milling and washing, Montana.



Machine shop, New York.

rock. The stone is used not only for building purposes, but also for making roads and pavements. Slate rock is used for roofs, and much limestone as a flux in smelting iron. Some limestone, when highly heated, yields the cement and lime of which mortar is made.

Supplemental Work. Bring to the school collection specimens of minerals, metallic ores, or stones. Bring to school an account of one mineral product, or of one method of mining or quarrying. Write next day a reproduction of the account given by one of your schoolmates.

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materials were raised; and the people of the western part of Europe rely upon the people of the United States for much of their wheat, flour, beef, and pork, and upon Australia for part of their mutton. Nearly all the tea used in the world comes from Asia; nearly all the coffee that we use comes from South America; and most of our sugar from the West Indies, South America, and the islands of the Pacific. India rubber comes from the equatorial regions of South America, Africa, and southeastern Asia, and many people in all the grand divisions light their homes at night by burning kerosene made of the petroleum from the wells in the United States.

Because of railroads and steamships and labor-saving machinery, all these, and hundreds of other things, can be manufactured and transported many thousands of miles and then sold at a profit, and yet are so cheap that few people are too poor to buy and use them.

As only the products not used at home are exported to other countries, foreign commerce forms a very small part (about one seventh) of the whole commerce of the world.

Means of Transportation. Goods are transported not only on railroads and ships, but also by teams on common roads and by boats on rivers and canals. Teaming is necessary in carrying goods to all the commercial routes, but it is the most expensive mode of transportation. A team can drag so small a load, and travels so slowly, that if the distance is great the food and care of the team will cost as much as the load is worth. Transportation by river, canal, or sailing vessel on the ocean is very cheap, though much slower than by railroad or steamship, and this method of transportation is still much used, especially for heavy, bulky articles; but in the more civilized countries most of the traffic is by railroad, and about half of the ocean traffic is by steamship.

Aids to Commerce. Telegraph cables, laid on the sea bottom, connect all the continents, so that information can be sent instantly to the most distant countries; and postal routes have been established, by which, at little cost, letters may be quickly and surely delivered at almost any place in the world. The telegraph, the telephone, and the post office are invaluable aids to commerce.

In order to promote foreign commerce, each country has, in all the large trading cities in the world, men called *consuls* to look after the interests of its sailors and merchants who trade there, and to collect information about what the people of the country produce and what they need. Most civilized countries also issue maps of the coasts and harbors, and build lighthouses and life-saving stations along the coasts. Many countries also deepen their harbors and rivers and build canals connecting them. In some countries the government owns the railroads, and in nearly all civilized countries it has aided in building them.

Supplemental Work. Make a list of the articles on the breakfast table this morning and try to find where each article came from, and



A sailing vessel.



A modern steamship.



An American railway train.

how it was manufactured. Write a history of one article on your list. Find whether any article produced in your neighborhood enters into our foreign or domestic commerce. Find out about Robert Fulton, Samuel F. B. Morse, George Stephenson, Alexander Graham Bell, or any other inventor who has improved the methods of commerce.

TOWNS AND CITIES.

Use. Towns and cities are the places where the trade and manu-

facturing of the world are chiefly centered. Neither grain and cattle for food, nor cotton and wool for clothing, nor lumber and iron for the hundreds of useful things made from them, nor petroleum and coal for light and fuel, nor any other raw materials are usually produced in cities. But, if we want to buy any of these things, we do not seek the place where it is produced; we go to a

town or a city, where all kinds of products are sent to be manufactured and sold. Thus a city is a convenience both to producers and to purchasers, and therefore it must be within easy reach of both. Hence cities have usually grown up at good harbors, or on navigable rivers or lakes, or at the junction of railroads; at waterfalls or rapids, or near mines of some kind. Why are such places favorable for the growth of cities? Among the cities and towns, the one that can be most easily reached by the greatest number of people, and by the greatest amount and variety of products, is sure to grow to be the largest.

Try to find out why the town in which you live, or the town nearest your home, is located where it is. It was built there for *some reason*, which probably has to do with trade or manufacturing. A town, however, may grow up about a great school or college, or at a place selected as the seat of government, or *capital*, of a country, or because it is a convenient or beautiful place of residence for those doing business in a much larger neighboring city or town.

Features. The most striking feature of a large city is the great number of people that are crowded within it. The streets are lined on both sides with houses, from two



Drainage. Name the two longest rivers of the Central Lowland. Which flows south? What great river basin occupies the part of the Central Lowland between the Mississippi and Mackenzie basins? In what general direction does the Nelson-Saskatchewan River flow? In what part of the Central Lowland are the Great Lakes situated? The divide between the Great Lakes and the Mississippi system is so low that in some places the water of the lakes may be easily turned into the Mississippi system. Through what river does the water of the Great Lakes reach the ocean? Into what does the Rio Grande empty? What is the general direction of its flow?

Name the three largest rivers of the Pacific slope. In what mountains do they all rise?

In what direction do most of the rivers of the Atlantic plain flow? How do they compare in length with those of the Central Lowland; with those of the Pacific slope?

Most of the great rivers of the grand division have their head waters in what divide? What is the only exception among the great rivers?

What parts of North America have no drainage to the sea? What becomes of the water of these regions?

The Missouri is really the main stream of the upper Mississippi system. From the table on p. 159 tell how the Mississippi-Missouri ranks among the world's great rivers in length. It is useful as a commercial highway.

Just below the Great Lakes the St. Lawrence is obstructed by rapids, so that canals are necessary for the ascent of boats; but below the rapids large seagoing vessels ply during that part of the year when the river and gulf are not blocked by ice.

Into what waters does the Mackenzie empty; the Yukon; the Colorado; the Mississippi? All these waters, at the points where the rivers empty, are nearly tideless, and consequently these four large rivers have built great deltas. How were these deltas formed? There is a bar at the mouth of the Columbia, though it is well covered with water even at low tide. The estuary of the St. Lawrence is a submerged valley.

The northern half of the great Central Lowland has thousands of lakes. Why is this part of the grand division rich in lakes? (p. 20.) They are so numerous, and many of them are so close together, that the usual mode

of travel is by canoes; these are carried on the shoulders of the travelers from one lake to another across the short divides. Such a divide is there called a *portage*, from a word which means "to carry."

Climate. What part of North America has cold winters and temperate summers? Which part has temperate winters and hot summers? Which parts are always hot? Which



parts are always temperate? Which parts have cold winters and hot summers? What part of North America lies in the trade-wind region? (map, p. 26.) What winds prevail over the greater part of North America?

The central part of the west coast is always temperate, because the prevailing westerlies, which have the nearly uniform temperature of the Pacific Ocean, warm the coast in winter and cool it in summer. By the time the winds reach the eastern coast they have acquired the temperature of the land over which they have traveled; hence the east coast is colder in winter and hotter in summer than the west coast.

Along the northwest coast the prevailing westerly winds deposit copious rainfall as they ascend the abrupt slope of the great highland region. What part of this coast is crossed by the tropical calms? (p. 26.) Are these calms accompanied by wet or by dry weather? Hence the climate in the region north of the Gulf of California is quite dry. In the southern part of North America the northeast trade winds bring copious rains to the east slopes in the winter half of the year; but in summer, when the heat equator lies farthest north, monsoon winds blow toward it from the Pacific and bring rain to the southwest coasts. Farther north, the westerly winds, which have lost their moisture on the west side of the mountains, reach the plateaus as dry winds. In the eastern half of the grand division, however, where the southerly winds in cyclones bring vapor from the Gulf of Mexico and the Atlantic, there is abundant rainfall.

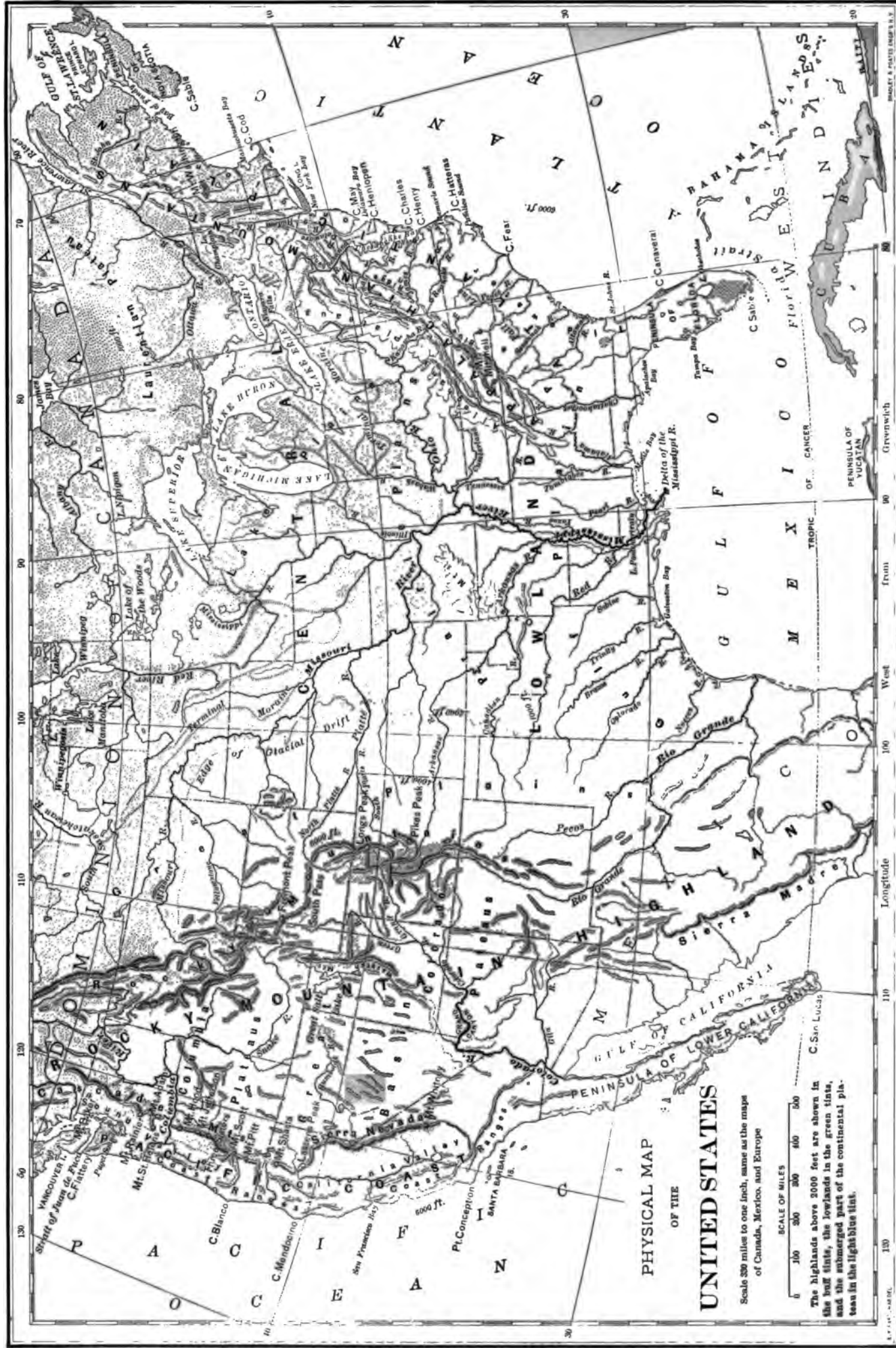
Supplemental Work. Draw a circle to represent the western hemisphere, and make a sketch map showing what part of the hemisphere is covered by North America. Draw, on a larger scale, the outline of this grand division. Model North America. Write a comparison of the climates on the eastern and western coasts of North America.

VEGETATION AND ANIMALS.

In what part of North America are there dense forests? Why are these regions densely wooded? Where are the regions of more open forests? Where are the regions of grassy lands; of tundras? What are tundras? Where are the desert regions? Why are these parts of North America deserts?

Animals. (Review the lesson on the North American life region, pp. 31, 32.) Along the Arctic coasts of North America the largest animals are the polar bear and the musk ox. Farther south, in the open forests, range the





Map Exercise. What lands and waters border the United States? What is its greatest length; width? Trace the continental divide across it. What slope is west of this divide? What highland region embraces most of this slope? What mountains border this highland on the west? The region west of these mountains may be called the *Pacific*

coast region. Toward what arm of the sea does most of our country slope east of the continental divide? Trace the northern divide of the Gulf slope. In what physical region is most of this divide? Toward what two arms of the sea does the surface slope north of this divide? Trace the eastern divide of the St. Lawrence and Gulf slopes. In what

region is most of this divide? What slope is east of it? What region is embraced in this slope? Name the five chief slopes of the United States. The five great physical regions. Make a sketch map of the United States and draw the divides between its five great slopes. Show the five physical regions on your map by shading with different colored pencils.

almost to sea level, reducing it to a low *peneplain* (p. 18), while the detritus worn from it was deposited in nearly level layers on the sea bottom to the east of the Fall line, where it gradually hardened into rock. Then both regions were slowly upheaved, and the newly made layers of rock became the low, flat Tidewater region. The upheaval of the Piedmont region quickened the current of its streams and enabled them to cut their present valleys in its nearly level surface and render it somewhat rough and hilly again. Thus the Tidewater region was made beneath the sea, while the Piedmont region was formed by prolonged erosion. After river valleys had been worn in the Tidewater region some parts of it sank slightly, permitting the sea to extend far up the valleys to form estuaries. Find New York, Delaware, and Chesapeake bays. They were made in this way.

Northeast of the Hudson River the Atlantic plain is narrower and is composed mainly of the Piedmont region, which extends in most places to the seacoast. There its hard rocks form bold headlands and high, rocky islets, between which are deep fiords and sheltered sounds. The whole region is covered with the remains of the old Laurentian glacier—gravels, clays, huge boulders, and round-backed glacial hills. Many of the old valleys were dammed or partly filled by the glacial drift, above which lakes formed, and the streams thus turned from their old courses have had to cut new channels in the hard rocks. These channels are not yet worn down to uniform slopes; therefore the streams abound in falls and rapids.

Long Island and the smaller islands east of it, as well as the hook-shaped peninsula of Cape Cod, are largely composed of the clays and gravels heaped up in the terminal moraine along the melting end of this old glacier.

TOPICS ON THE ATLANTIC PLAIN.

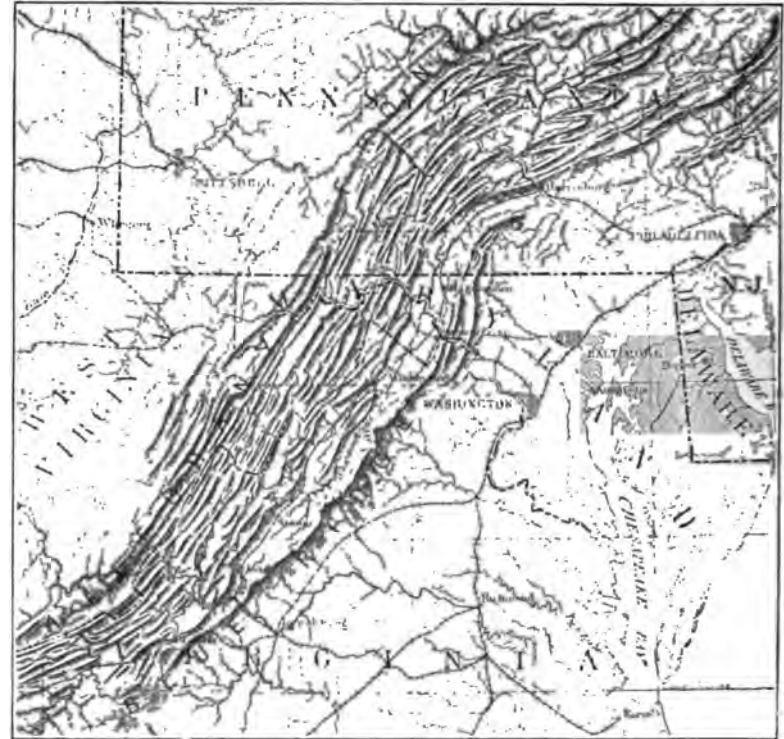
I. NORTHERN PART. Width. Surface: hills; lakes; soil. Coast: indentations; projections; islands.

II. SOUTHERN PART. Western region: surface; drainage; formation; name. Eastern region: surface; coast—borders, indentations; drainage; formation; name. Fall line: reason for; formation; value.

THE APPALACHIAN MOUNTAINS.

What region lies west of the Atlantic plain? (map, p. 48.) Between what two gulfs does this region lie? Measure the length of the region, using the scale of miles.

South of Hudson River, the eastern half of the Appalachian region consists of a series of long, narrow mountain ridges, nearly parallel to one another, and sepa-



The northern part of the Appalachian ridge and valley belt.

rated by wide and fertile valleys. This part of the region is called the *Appalachian ridge and valley belt*.

The ridges are of nearly uniform height—a little less than half a mile. They have remarkably smooth and even summits. The eastern range is most massive and irregular. What is it called south of Potomac River? It grows higher toward the south. Find Mount Mitchell. About how high is it? (p. 45.) The valley just west of Blue Ridge is the longest and widest of the Appalachian valleys. This "Great Valley" extends southwest from the Hudson to the Alabama River.

The western half of the Appalachian region is a broad upland, having about the same height on the east as the Appalachian ridges, but decreasing in elevation toward the west. The streams have worn deep, narrow valleys into its surface, thus cutting it into a number of detached plateaus, called the *Alleghany plateaus*.

Trace the divide of the Atlantic slope southwestward from the source of the Hudson. Near which side of the Appalachian region does it lie in the north; in the south? In the north the larger streams flow southeast



The Lehigh water gap near Mauch Chunk, Pennsylvania.



The Delaware water gap between Pennsylvania and New Jersey.



The Prairie plains, eastern Kansas.

to the Atlantic, crossing the mountain ranges one after another in *water gaps*. Name three such streams. In the south, on the contrary, the larger streams rise in the eastern range and are tributaries of the Ohio, to the northwest. They have cut deep gorges through the whole width of the plateau to reach that river. Name two such streams. These gorges and water gaps are of great use to commerce in affording low routes across the mountains.

When the Appalachian Mountains were first upheaved above the sea, the rocks in the eastern half of the region were thrown into many long folds or waves, which were crowded close together. Most of the rock layers in the folds are quite soft, but some of them are very hard. The erosion of ages carried away the tops of the folds (p. 11), exposing the edges of the layers within, and reducing the region to a peneplain near sea level. Then this leveled region was again upheaved, but so slowly that the larger streams flowing across it to the sea could cut their channels across the hard layers as fast as the region rose. The branches of the larger streams, from the right and left, rapidly eroded the soft layers as the region rose, forming the long Appalachian valleys, while the hard layers in the sides of the old folds were eroded more slowly, and were thus left projecting as the parallel, even-topped Appalachian ridges.

In the western half of the Appalachian region the rock layers are nearly level. The surface is now composed of a hard and thick layer, which weathers very slowly, and as it rose it was cut through only by the narrow valleys of the larger streams; so that this region now remains as the rough upland called the Alleghany plateaus.

Find where the glacial moraine crosses the mountains. North of this the Appalachian region was once so deeply covered by the Laurentian glacier that only the highest mountain peaks projected above the ice. The glacier widened many of the valleys, rounded and softened the mountain outlines, and left the region covered with drift.

TOPICS ON THE APPALACHIAN MOUNTAINS.

I. NORTHERN PART. Valleys: formation; drainage — lakes, rivers, falls. Mountains: shape; position.

II. SOUTHERN PART. Western region: slope; surface. Eastern region: ridges — formation, height, shape, direction, chief peak; valleys — shape, formation, chief one. Drainage: northern; southern; uses of river valleys.

THE CENTRAL LOWLAND.

What three slopes of the United States lie mostly or entirely in the Central Lowland? (map, p. 48.) What river system drains most of the Central Lowland in the United States? What is the largest eastern

tributary of the Mississippi? Name the three largest western tributaries. What is the largest system of the Gulf slope, after the Mississippi? Name several other streams of the Gulf slope west of the Mississippi system; several east of that system.

The Central Lowland slopes from the Alleghany plateaus imperceptibly southwestward to the Mississippi River, where a more rapid but still imperceptible ascending slope begins and continues to the very foot of the Rocky Mountains, at an elevation of over a mile.

The surface of this vast region is remarkable for its smoothness. In the main it is broken only by the "bluffs," or hillsides which border the broad flood plains.

Trace the terminal moraine through this region. North of its low, gravelly "kettle hills," the country is thickly covered with glacial drift and contains thousands of lakes; so that this region may be called the *Lake plains*. Find it on the map.

In the drift-covered region south of the moraine most of the glacial lakes have been drained or filled with sediment. The uplands of this region, and of the country to the south and west, were grassy prairies when first visited by white men. The region may therefore be called the *Prairie plains*. Find it on the map.

From the mouth of the Ohio trace lines to the southeast and to the southwest. Into what do nearly all the streams south of these lines empty? This region is called the *Gulf plain*. Toward the coast it is much like the Tide-water region.

Through the center of the Gulf plain the mighty Mississippi meanders in a great flood plain seventy miles wide. This is one of the most fertile regions in the world, and contains many farms or plantations. *Levees*, or embankments, have been built along the river to prevent overflows. During high water a break, or *crevasse*, sometimes occurs, and then the country far and wide is covered with water. The mouth of the river projects far into the Gulf beyond the even curve of its shore line. Why?

Where are the Ozark Mountains? They are the most rugged part of the Central Lowland. What river divides this region into two parts? North of this river the land consists of rugged plateaus. South of it, however, the rocks have been folded and eroded into ranges of hills and low mountains.



A levee on the lower Mississippi River.

TOPICS ON THE CENTRAL LOWLAND.

- I. SLOPES. Eastern. Western. Northern. Southern.
 II. RIVERS. Chief: basin; divides; branches; banks; mouth.
 Other rivers.
 III. REGIONS. Northern: edge; surface; covering. Central: limits; covering. Southern: drainage; covering; coast. Mountains: position; northern part; southern part.

THE ROCKY MOUNTAIN HIGHLAND.

About how much of the United States is embraced in the Rocky Mountain highland? (map, p. 48.) About how much of the width of the highland lies east of the Rocky Mountain chain? Trace through the highland region the divides of the two great river basins west of the continental divide. What is peculiar about the drainage between these basins? What does this peculiarity indicate about the climate?

Most of this region is quite dry. Only its higher parts receive enough rainfall to support forest growth; the general surface of the plateaus in some places is a true desert. East of the Rocky Mountains the highland descends imperceptibly into the lowland plains, and, as it has the same general smoothness of surface, it is called the *Great Plains*.

The larger streams flowing across the Great Plains are kept so choked with the sand brought in by their tributaries, that the valleys are widened faster than they are deepened, and are therefore generally broad and shallow. In some places toward the north, however, the soft rock has been eroded into a maze of deep gullies. As it is therefore difficult to travel across these places, they are known as *Bad Lands*.



The "Bad Lands," South Dakota.

The *Rocky Mountains* occupy the highest extensive part of the highland. The base of these mountains is nearly $1\frac{1}{2}$ miles high, while the ranges themselves rise between one and two miles higher. The lower slopes are forest-clad; the jagged crests are bare rocks except when covered with snow.

Find the break in the chain known as *South Pass*. North of this the ranges are quite irregular in direction. Some of them are the remnants of rock folds, some are upheaved and tilted blocks of rock, and others are formed of volcanic outflows, though the only indication of present volcanic activity is a wonderful geyser region near the source of the Yellowstone. South of the pass the ranges are more nearly parallel. As a rule, each range is a single broad rock fold, from which the top layers have been eroded away, thus exposing the hard granite rock which now forms the higher, central part of the range. Between the ranges are wide, grass-carpeted valleys, or "parks."



Crater of Castle Geyser, Wyoming.

When the *great plateau region* west of the Rocky Mountains was upheaved, the rocks were broken into great blocks, many miles in length. Some of them were lifted higher than others, forming plateaus at different levels, separated by lines of cliffs. Other blocks were greatly tilted in rising, the upturned edge forming a range of mountains, and thus the surface of the plateau region was rendered very uneven.



Illustrating the tilted block structure of the Plateau region.

Where are the *Columbia plateaus*? After the upheaval in that region, lava forced its way up through the fissures, and spread over the surface. Repeated outflows, meeting and overlapping, covered nearly the whole region with lava to a great depth, completely burying many of the upheaved and tilted rocks.

Into this vast lava plateau Snake River has cut a narrow canyon which is in some places three fourths of a mile deep.

Where are the *Colorado plateaus*? Here there were only slight outflows of lava, and the region is divided into many plateaus, some high, some low, separated by long lines of cliffs along the sides of the upheaved blocks. The region is remarkable for the deep, narrow canyons in which nearly all the streams flow.

These streams have been flowing in their present channels throughout much of the period of upheaval, and have deepened their channels about as fast as the surrounding country rose, and much faster than weathering could widen the channels in that dry region. Hence the channels have become narrow and impassable gorges or canyons, in some places over a mile deep.

What mountain range borders the upper Colorado basin on the west? The region between this range and the Sierra Nevada, extending south to the Gulf of California, is the driest part of the United States. There are few permanent streams. What becomes of their water? Why is the region called the *Great Basin*?

The uptilted edges of the blocks into which this region was broken as it rose have been eroded into numerous low, north and south mountain ranges. Between these are broad, level plains formed from the detritus washed down from the mountains. During the season when some rain falls, shallow lakes form in many of these valleys; but during the dry season they evaporate, leaving their beds incrustated with salt.

About the time that the Laurentian glacier covered the eastern part of North America, extensive lakes covered much of the Great Basin. Gradually the climate became drier, and the lakes became smaller as



Old lake terraces, Utah.

they evaporated. Great Salt Lake and a few smaller lakes are remnants of these old inland seas. Around the edges of the basin are now found several nearly level terraces which mark different heights of these old great lakes as their surface gradually receded.

Along the west side of the plateau region the upheaval has resulted in two prominent mountain ranges whose tops, like those of the Rocky Mountains, rise from one to two miles higher than the general surface of the plateau. What are the names of these ranges?

The *Sierra Nevada* is an enormous block of rock uptilted along its eastern edge, so that its surface slopes to the west. The dry eastern side is short and steep. The long western slope, however, is well watered. Why? The streams running down this long slope have cut deep canyons, leaving a succession of long mountain spurs between.

There were outflows of lava in the Sierra Nevada, but north of Lassen's Peak the outflows were so great that the tilted blocks are generally buried, and the impression is given that the *Cascade Mountains* are entirely composed of outflows of lava. The outflows here built up huge volcanic cones which now form the highest peaks of the Cascade Mountains. Find ten peaks north of Lassen's Peak. These are all old volcanoes, some of which are probably not yet extinct. Mt. Rainier, the highest, is nearly three miles high, and several of the others are high enough to be always capped with snow.

TOPICS ON THE ROCKY MOUNTAIN HIGHLAND.

I. PLAINS AND PLATEAUS. Eastern: surface; river valleys—south, north. Western: general appearance; formation; northern part—formation, valley; central part—limits, surface, drainage; southern part—surface, valleys, formation.

II. MOUNTAINS. Eastern: northern part—appearance, formation; southern part—ranges, valleys. Western: southern range—formation, slopes, streams; northern range—formation, peaks.

III. CLIMATE. Regions: western; eastern; mountain tops; Great Basin; lakes. Effect: on surface; on vegetation.

THE PACIFIC COAST REGION.

What mountains closely border the Pacific coast? What mountainous island lies at the northern end of these ranges? By what strait is it separated from them?

The *Coast Ranges* are much lower than the Sierra Nevada and the Cascade Mountains. They are the remains of wide rock folds. While they were being elevated they were a chain of mountainous islands, like Vancouver Island, or high peninsulas, like Lower California, and like them were bordered on the east by long, narrow sounds or gulfs.



Mt. Rainier, Washington.

Continued elevation has brought the bottoms of these gulfs slightly above the level of the sea to form the two great *lowland valleys* of the region. What are their names?

The bottoms of these valleys have been rendered very fertile by the fine detritus washed into them from the bordering mountains, so that now they are among the most fertile parts of the country. Through what bay does the drainage of the California valley now reach the ocean? It occupies the site of an old strait somewhat like the present Strait of Juan de Fuca. What great river flows across the northern valley? The deeper northern part of this valley is still occupied by a small island-studded arm of the sea. What is its name?

The upheaval of the Rocky Mountain highland and of the Pacific coast region has occupied thousands of years, but this period is really very short in comparison with the great age of the earth, and it has been the latest period in the earth's long history. The Appalachian Mountains were already old and had been worn down by ages of erosion long before the region of the western highlands had appeared above the sea. Thus, in comparison with the Appalachians, the western mountains are very young; they are among the youngest mountains in the world. But it is thought that the upheaval of the western highland is not yet completed. The region is still subject to earthquakes, caused by slight movements of the great blocks into which the region is broken, and some of its volcanoes, though they appear to be nearly extinct, still show occasional signs of activity.

TOPICS ON THE PACIFIC COAST REGION.

I. RANGES. Position. Extent. Height. Formation.

II. VALLEYS. Formation. Divisions. Drainage. Soil.

III. AGE. Real. Comparative. Evidences of.



California valley and Sierra Nevada, California.



CLIMATE.

In what zone is the main part of the United States? The north temperate heat belt travels northward in summer and southward in winter. Why? In summer it is so far north that its southern edge occupies the position represented by the dotted line in the left-hand chart above. All the country south of this line is in the hot belt at that season. In winter, however, the edge of the hot belt is in Mexico, and the temperate belt covers only the southern part of the United States, while all the country north of the heavy line in the chart is in the cold belt.

It thus follows that, as regards summer and winter temperature, there are four climatic belts or regions in the United States. Name and locate them from the chart. Why is the Pacific coast always temperate, but not the Atlantic coast? (pp. 26, 46.) Explain why the temperate belt in summer and the cold belt in winter extend farther south in the Rocky Mountain region than elsewhere (p. 24).

While the northern part of the United States is generally cooler than the southern part, the difference is but slight during the summer days, which are almost equally warm in all parts of the country east of the Pacific coast region. The great difference is in the winters, which are much longer and colder in the north than in the south.

In the region shown by the dots in the middle chart at the top of the page, there is no day in the year whose average temperature is below freezing. The number of freezing days in a year increases northwardly over the shaded portion of the chart, the first line showing where there are thirty days of freezing weather, the second line sixty days, and so on. In the central portion of the northern boundary, how many months are there whose average temperature is below freezing? How many days is that?

Throughout the United States, east of the Pacific coast region, but especially in the northern or northeastern half, the weather is subject to great and rapid changes at all seasons. These are caused by the cyclones or cyclonic storms which are almost always drifting eastward over the country. What is a cyclone? (p. 26.)

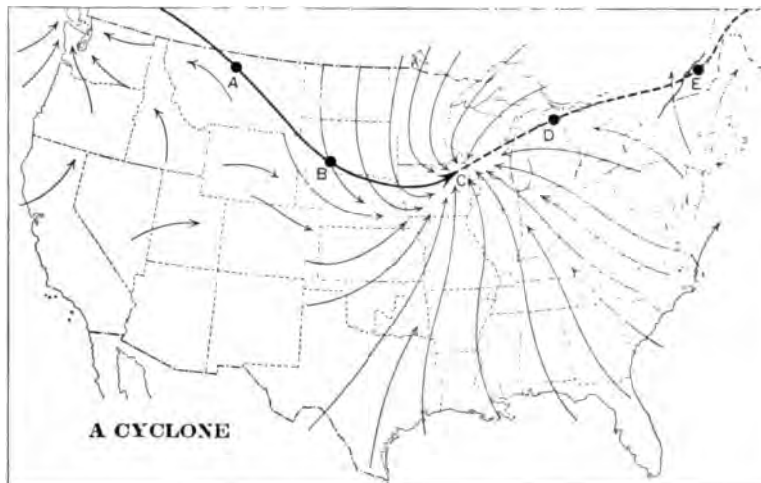
The effect of a cyclonic storm upon the weather is illustrated by the chart in the center of the page. The point of the heavy arrow lies in a storm center, around and into which the winds are whirling, as shown by the light arrows.

To the east of the center the winds come from the south and southeast and make the weather warm. What is the direction of the winds

to the west of the storm center? These winds bring cool or cold weather to that region. Why?

But the storm center is moving all the time. Twenty-four hours before it reached the position C it was at B; and a day before that at A; while observations on many cyclones indicate that a day's drifting from C will probably carry it to the neighborhood of D. Thus, as the storm drifts rapidly eastward over the country, it pushes warmer weather along in front of it, and drags colder weather along in its rear.

In the eastern half of the country the southerly winds in front of the cyclone are vapor-laden when they leave the Gulf of Mexico, but are somewhat chilled as they advance northward; hence cloudy, rainy, or snowy weather sweeps over that part of the country in front of the drifting cyclone. When the storm center is far west of the Gulf, however, the southerly winds in front of it come from the dry highlands instead of from the Gulf, and hence give little rain to the western half of the United States. The northerly winds on the western side of the storm center grow warmer as they advance southward, and hence are accompanied by clear, dry weather. Why?



Cyclones follow one another so rapidly that there are almost always one or more storm centers in the United States. The observers of the United States Weather Bureau take daily observations of the weather in different parts of the country, by which they are able to locate the existing storm centers, and by judging in what direction and how far the cyclone, with its warm wave, cold wave, and rain and cloud regions, will advance during the next twenty-four hours, they are able to determine the "weather probabilities" for the following day.

In the rainfall chart above, the regions shaded by lines would each year be covered more than twenty

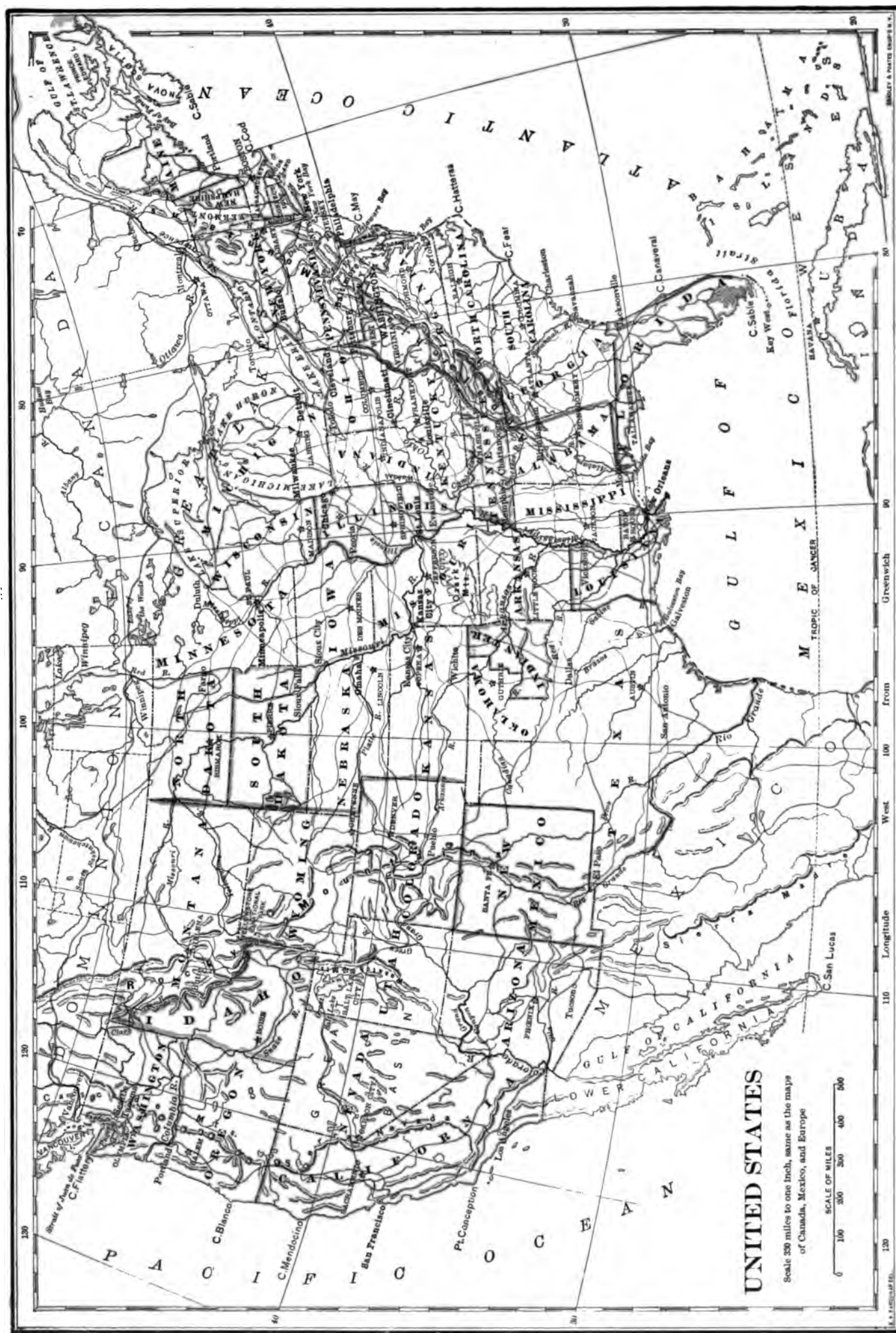
inches deep by the rainfall, if the water remained where it fell. This amount is ample for almost all kinds of farming. In the parts of the United States shown by dots, or left unshaded, the rainfall is less than twenty inches and is too little for successful farming, except in some parts of the north where the rains occur during the few weeks when the growing crops most need moisture. As a rule, however, irrigation is necessary for farming in these regions of light rainfall.

Explain why the eastern half of the United States has a heavier rainfall than the highland region of the west. Explain why the Pacific coast region has a heavier rainfall.

Supplemental Work. Read chapter 11, on Weather and Weather Predictions, in Waldo's "Elementary Meteorology."

GOVERNMENT.

Name several forms of government (p. 36). What is the form of government in the United States? Who has the power under this form?



Map Exercise. Name and locate six states lying entirely east of the Hudson River. Name and locate six states between the Hudson River and Chesapeake Bay which are bordered by the Atlantic or crossed by the Appalachian Mountains. Name and locate seven states between these and the Mississippi River. Which of them are touched by the

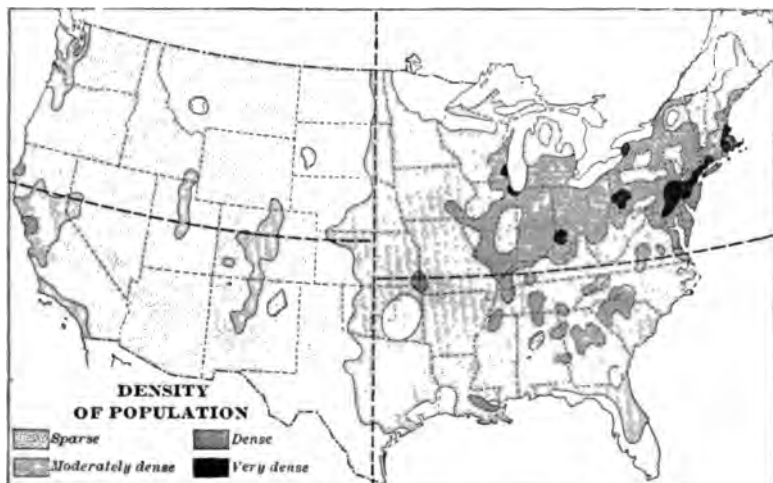
Great Lakes ? Which are touched by the Ohio River ? Name and locate seven northern states between the Mississippi River and the Great Plains. Name and locate seven southern states lying entirely east of the Mississippi River. Which of them border on the Atlantic ? Which border on the Gulf of Mexico ? Which one has no coast ? Name and locate

three southern states and two territories between the Mississippi River and the Great Plains. Name and locate three states and one territory which are crossed by the Rocky Mountains. Name and locate three states and one territory lying on the great plateaus west of the Rocky Mountains. Name and locate three states which border on the Pacific.

Before taking the following lessons devote several days to the study of the map on the opposite page, until you can name or locate without hesitation any state or territory on the little population map below.

POPULATION AND PROGRESS.

Imagine a north and south line and two east and west lines to be drawn across the United States, dividing it roughly into quarters as in the map below. Which quarter has the densest population? Which quarter ranks next in density of population? What part is very thinly peopled? With what climatic region does the thinly settled region nearly correspond? (p. 54.) With what great physical region?



Population. The eastern half of the United States contains nearly nine tenths of the people in the country. At the close of the Revolutionary War there were about four million people in the United States. In what part of the country did most of them live? What is the population now? (p. 157) Over what part of the country has it spread? Such a rapid increase and spread of population has never before been known in the history of the world. It has been caused by the millions of people, who, attracted by our cheap and fertile lands and the great opportunities for success in life under our free government, have left their homes in Europe and come to settle in the United States, as thousands still do every year.

People have come from all countries, but mostly from Great Britain, Ireland, Germany, and the Scandinavian countries. Whatever their nationality, however, they soon adopt our language, manners, and customs, and become thorough *Americans*.

Most of the European immigrants have landed on our northeast coast, and have moved inland to seek new homes. Hence the northeastern quarter of the country is not only most densely settled, but has the largest foreign population.

Few immigrants land in the southeastern quarter, and most of the people in that region were born in this country. Hence there are few foreigners in that quarter; but there are about as many negroes there as foreigners further north.

What races inhabit the thinly settled region? (p. 49.) There are many more whites than Indians, and most of them were born in the United States.

On the Pacific coast there is a large foreign population. They are mainly Europeans who have crossed the country from the east coast; but about one fourth of the foreigners are Chinese. To what race do they belong?

Progress. No other highly civilized nation occupies so large a continuous territory as the United States, or is so well fitted for the successful pursuit of so many branches of human industry. Nowhere else in the world is there so vast a number of highly civilized and energetic people living under a single government, speaking the same language, and having the same general customs and standards of life.

Because of these advantages, industries of all kinds have increased in this country even more rapidly than the population, so that to-day the United States, though one of the youngest, is one of the greatest nations in the world. Not only is the total product of *all* the seven chief industries pursued by man greater in this country than in any other, but the product of *each* of these industries is greater than in any other nation. Make a list of the seven great industries of man.

By most of these industries the people in the United States produce some articles in such large quantities that there is sufficient to supply the wants of our own great population and to leave a surplus for export to other countries where the article is needed. Thus the people of nearly every country in the world have come to rely upon the workmen of the United States for some of the necessities of life.

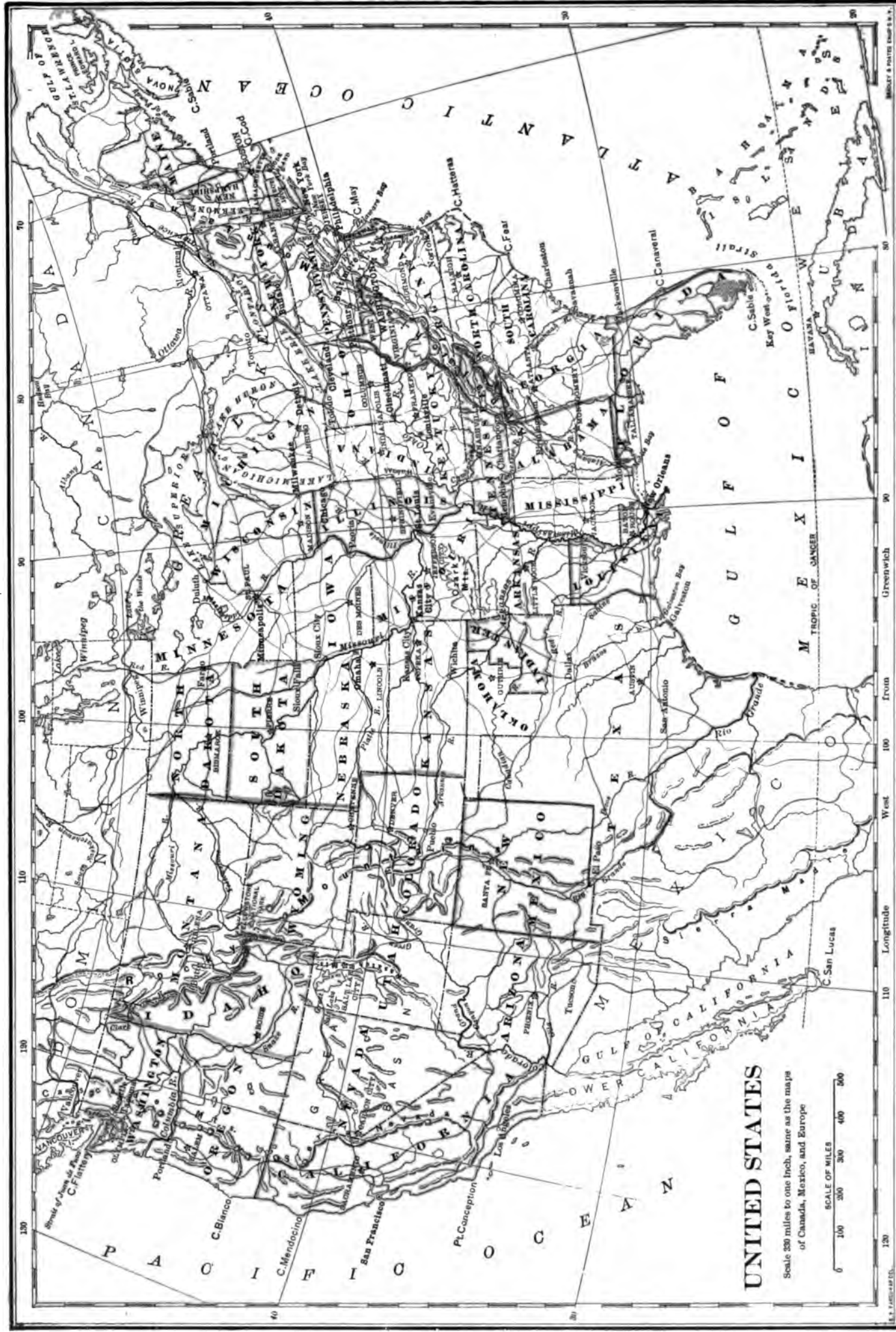
Supplemental Work. Make enlarged copies of the maps opposite p. 64 and the diagram opposite p. 124 in Gannett's "Building of a Nation," for your schoolroom wall. Read or recite "The Axe of the Settler," by Mary E. Hewitt, or "The Pioneer," by Lowell. Read chapters 1, 4, and 15 in "Children's Stories of American Progress," by Henrietta Christian Wright.

PRODUCTION.

Agriculture. More of our people are engaged in farming than in any other occupation. What parts of the country are best adapted for farming? (p. 54.) Why?



Immigrants landing at New York city.



Map Exercise. Name and locate six states lying entirely east of the Hudson River. Name and locate six states between the Hudson River and Chesapeake Bay which are bordered by the Atlantic or crossed by the Appalachian Mountains. Name and locate seven states between these and the Mississippi River. Which of them are touched by the

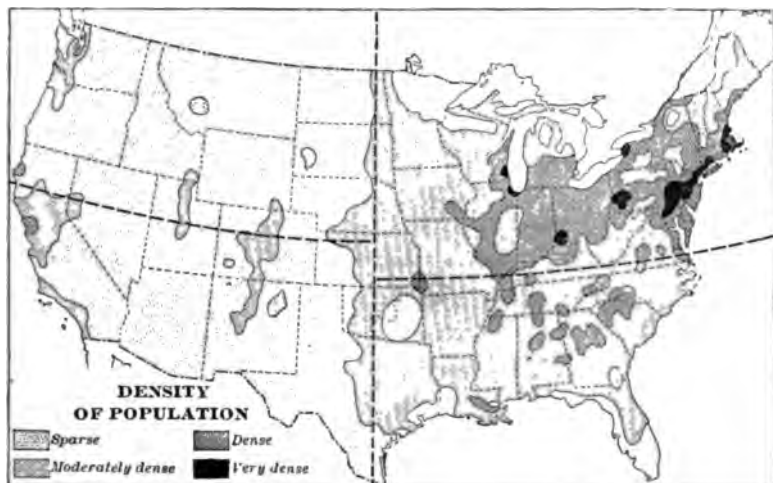
Great Lakes? Which are touched by the Ohio River? Name and locate seven northern states between the Mississippi River and the Great Plains. Name and locate seven southern states lying entirely east of the Mississippi River. Which of them border on the Atlantic? Which border on the Gulf of Mexico? Which one has no coast? Name and locate

three southern states and two territories between the Mississippi River and the Great Plains. Name and locate three states and one territory which are crossed by the Rocky Mountains. Name and locate three states and one territory lying on the great plateaus west of the Rocky Mountains. Name and locate three states which border on the Pacific.

Before taking the following lessons devote several days to the study of the map on the opposite page, until you can name or locate without hesitation any state or territory on the little population map below.

POPULATION AND PROGRESS.

Imagine a north and south line and two east and west lines to be drawn across the United States, dividing it roughly into quarters as in the map below. Which quarter has the densest population? Which quarter ranks next in density of population? What part is very thinly peopled? With what climatic region does the thinly settled region nearly correspond? (p. 54.) With what great physical region?



Population. The eastern half of the United States contains nearly nine tenths of the people in the country. At the close of the Revolutionary War there were about four million people in the United States. In what part of the country did most of them live? What is the population now? (p. 157) Over what part of the country has it spread? Such a rapid increase and spread of population has never before been known in the history of the world. It has been caused by the millions of people, who, attracted by our cheap and fertile lands and the great opportunities for success in life under our free government, have left their homes in Europe and come to settle in the United States, as thousands still do every year.

People have come from all countries, but mostly from Great Britain, Ireland, Germany, and the Scandinavian countries. Whatever their nationality, however, they soon adopt our language, manners, and customs, and become thorough *Americans*.

Most of the European immigrants have landed on our northeast coast, and have moved inland to seek new homes. Hence the northeastern quarter of the country is not only most densely settled, but has the largest foreign population.

Few immigrants land in the southeastern quarter, and most of the people in that region were born in this country. Hence there are few foreigners in that quarter; but there are about as many negroes there as foreigners further north.

What races inhabit the thinly settled region? (p. 49.) There are many more whites than Indians, and most of them were born in the United States.

On the Pacific coast there is a large foreign population. They are mainly Europeans who have crossed the country from the east coast; but about one fourth of the foreigners are Chinese. To what race do they belong?

Progress. No other highly civilized nation occupies so large a continuous territory as the United States, or is so well fitted for the successful pursuit of so many branches of human industry. Nowhere else in the world is there so vast a number of highly civilized and energetic people living under a single government, speaking the same language, and having the same general customs and standards of life.

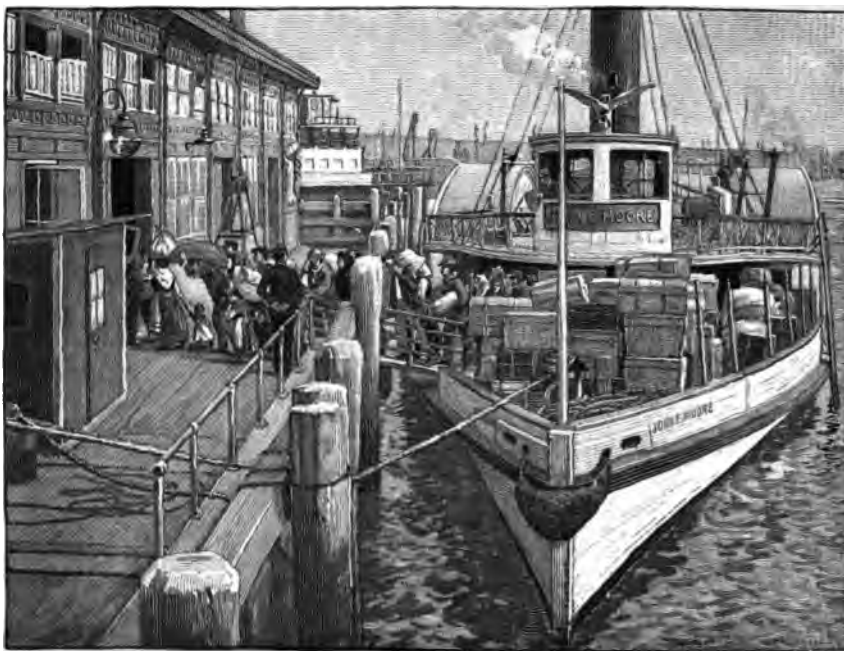
Because of these advantages, industries of all kinds have increased in this country even more rapidly than the population, so that to-day the United States, though one of the youngest, is one of the greatest nations in the world. Not only is the total product of *all* the seven chief industries pursued by man greater in this country than in any other, but the product of *each* of these industries is greater than in any other nation. Make a list of the seven great industries of man.

By most of these industries the people in the United States produce some articles in such large quantities that there is sufficient to supply the wants of our own great population and to leave a surplus for export to other countries where the article is needed. Thus the people of nearly every country in the world have come to rely upon the workmen of the United States for some of the necessities of life.

Supplemental Work. Make enlarged copies of the maps opposite p. 64 and the diagram opposite p. 124 in Gannett's "Building of a Nation," for your schoolroom wall. Read or recite "The Axe of the Settler," by Mary E. Hewitt, or "The Pioneer," by Lowell. Read chapters 1, 4, and 15 in "Children's Stories of American Progress," by Henrietta Christian Wright.

PRODUCTION.

Agriculture. More of our people are engaged in farming than in any other occupation. What parts of the country are best adapted for farming? (p. 54.) Why?



Immigrants landing at New York city.



UNITED STATES - REST OF WORLD

The world's cotton crop.

One of our most important crops is *cotton*. For what is cotton used? Cotton is our chief export. What part of the world's crop is grown in this country? Cotton requires a warm, moist climate. In what part of the United States is there such a climate? The shaded portion of the above map shows where cotton is grown. Which quarter of the country embraces most of the cotton-growing region? There are other important crops and other industries in this region, but the cotton crop is the most valuable product.



U.S. - REST OF WORLD

The world's wheat crop.

wheat-growing regions of the United States. In which quarter of the country is most of the wheat grown? Although the greater part of the wheat is also raised in the fertile valleys near the Pacific coast. Corn is our largest crop. What part of the corn crop of the world do we raise? Corn grows in nearly all parts of the eastern United States, but most of it in the southern half of the wheat region. Much corn is used by people in this country for food, and much is exported for that purpose, but by far the greater part is used here to fatten hogs.

Many other food crops are raised in the United States, but chiefly in the northeastern quarter, which is thus, except in the extreme northeast, the great food-producing section of the country.

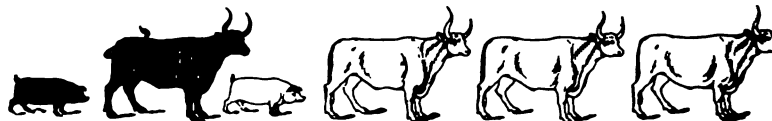
UNITED STATES - REST OF WORLD
The world's corn crop.

UNITED STATES - REST OF WORLD

The world's tobacco crop.

As much *tobacco* is raised in the United States as in all the rest of the world together, and of this crop there is a large surplus for export. The chief tobacco-growing regions are shaded on the above map, three quarters of the crop being raised in the regions of darker shading.

Herding. About half of the hogs and one fourth of the cattle in the world are raised in the United States, and



UNITED STATES - REST OF WORLD

The world's product of cattle and hogs.

from them is obtained so large a surplus of pork and beef that, after cotton, meat is our greatest export. Horses and sheep are raised in greater numbers than in most countries, but scarcely in excess of our own wants.

Where is the great corn-growing belt? The greatest number of hogs are raised in that belt. Why? Cattle are raised chiefly in the same region and westward over the Great Plains, where there is sufficient moisture for coarse pasturage. Most of the horses are reared on the richer pastures of the Prairie plains. Where are they? What fiber is obtained from sheep? Fleeces grow thickest and best in a rather cool climate, hence the great sheep ranges are in the northern part of the Appalachian region, on the uplands of the Lake plains, in the western highlands, and on the Pacific coast.

Fishing. The product of the fisheries of the world is of less value than that of the other great industries, but more fish are caught by people from the United States than by any other people. What part of the catch of the world is obtained by our fishermen?



U.S. - REST OF WORLD

Fisheries of the world.

Oysters and codfish from the northeast coast and salmon from the northwest coast

are the most important products. These are exported in considerable quantities, but the total amount is not large in comparison with our great exports.



U.S. - REST OF WORLD

Lumbering of the world.

Lumbering. Fully one third of the timber cut in the world each year comes from the forests of the

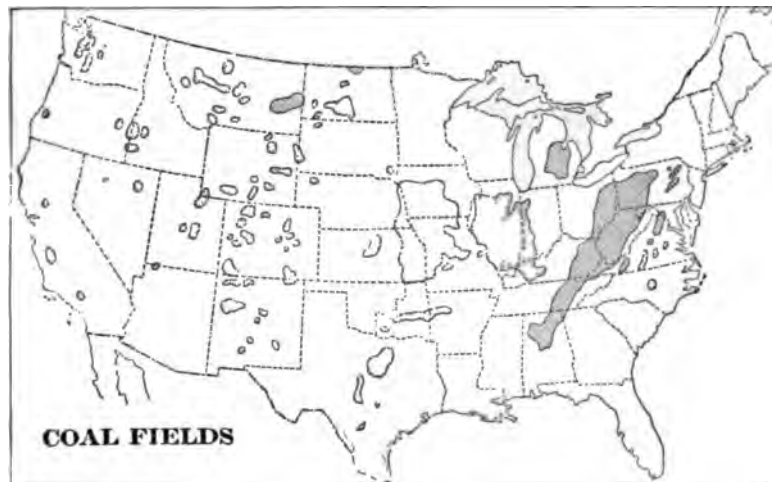


United States. Indeed, lumbering is carried on so extensively and recklessly in this country that in a few years our best forests will be destroyed unless cutting is more carefully regulated. Lumber, in the shape of logs, beams, boards, and shingles, forms one of our important exports.

In what two parts of the country do the largest forests occur? Why are forests found in these regions rather than in the others? Where are the heavily forested regions? What kinds of valuable woods prevail in each region?

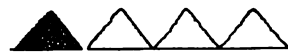
Mining. The mines of the United States are among its most valuable resources, and yield about one third of the mineral product of the world. By far the most valuable of the mineral productions are coal and iron; then follow in value petroleum, gold, copper, and silver. The yield of each of these is enormous. The petroleum and copper amount to more than half of the world's supply, and these two minerals, together with coal, are important articles of export.

Which quarter of the country contains the greater part of the three largest coal fields? Three fourths of our coal is mined in the large east-



U.S. - REST OF WORLD
The world's output of coal.

but about two thirds of our product is mined near the south and west shores of Lake Superior, and most of the rest is found in the eroded rock folds of the Appalachian ridges.



U.S. - REST OF WORLD
The world's output of iron ore.

More than nine tenths of the *petroleum* occurs near the northwestern part of the great eastern coal field and westward nearly to the great middle coal field.

Gold and *silver* are mined chiefly in the Rocky Mountains and the Sierra Nevada, while by far the greater part of the *copper* comes from two small clusters of mines, one near the south shore of Lake Superior and the other near the source of the Missouri River.



U.S. - REST OF WORLD
The world's output of gold and silver.

Manufacturing. Not only is the United States the greatest manufacturing country, but in the extent and variety of manufactures it surpasses any two other countries in the world. Nearly every kind of manufactured article wanted by civilized man is made somewhere in our country, and nearly always it is made more cheaply here than anywhere else, for in no other country is there so much labor-saving machinery used as in the United States.

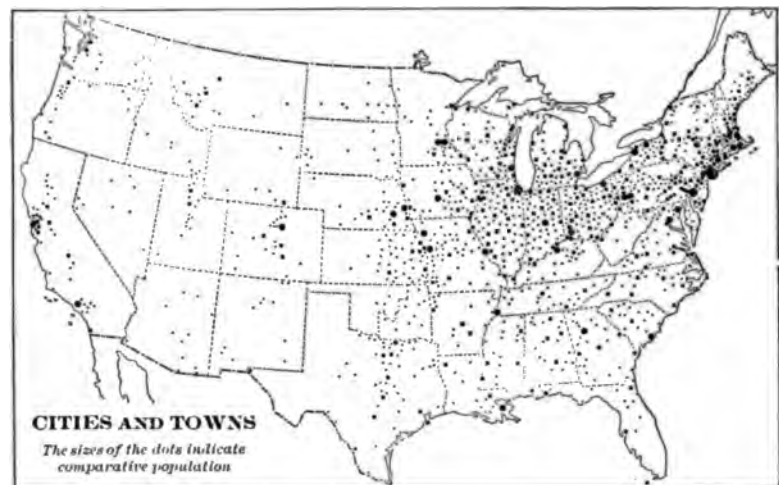


U.S. - REST OF WORLD
The world's manufactures.

The ten greatest manufactures of our country are:

1. Flour and corn meal.
2. Cotton and woolen cloth.
3. Packed meats (beef and pork).
4. Iron and steel goods.
5. Machinery.
6. Lumber.
7. Clothing.
8. Liquors.
9. Shoes and leather goods.
10. Books and newspapers.

Nearly all of these, and many other manufactured goods, are important articles of export—particularly meats, flour, and iron and steel goods.



You have learned that most of the manufacturing of the world is carried on in cities and towns. On this map the cities and towns of the United States are shown by dots, the larger dots standing for the larger manufacturing centers. In which quarter of the United States is most of the manufacturing carried on? Why do you think so? About nine tenths of our manufacturing is done in that quarter of the country. Compare this map with that of the coal region. Mention one advantage which that quarter of the country has for manufacturing. Where is most of our iron ore mined? To smelt the iron from the ore, much fuel is necessary, and as the ore can be transported cheaply by water, the regions where the great coal fields approach the Great Lakes have become the most important centers of the iron and steel industry. Why? The manufacture of flour, meat, the liquors which are made from grain, and lumber is also carried on chiefly west of the Appalachian Mountains. Why? What are the other great manufactures? They are made chiefly east of the mountains.

Supplemental Work. Read chapters 3, 4, and 5 in Carnegie's "Triumphant Democracy." Make an enlarged copy of the plates opposite pp. 164 and 170 in Gannett's "Building of a Nation," for the school-room wall.

COMMERCE AND WEALTH.

Commerce. The collection of raw materials from the various parts of the United States at the points of manufacture or export, the distribution of the manufactured products to the places where they are to be used or exported, and the importation and distribution of goods



U.S. + REST OF WORLD +

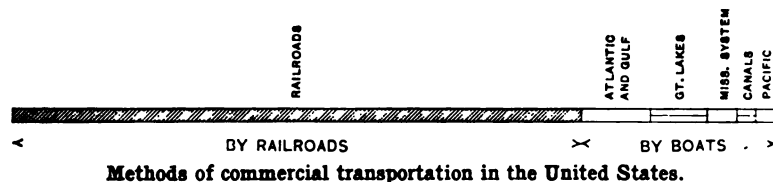
The world's commerce.

not produced in the country, give rise to a commerce greater than that of any two other nations in the world.

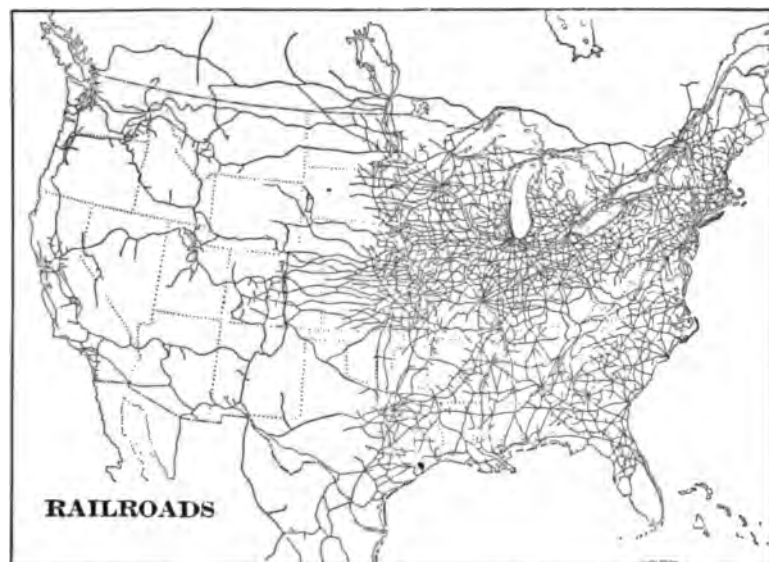
Although our *foreign* commerce (exports and imports) is exceeded by that of only one other country, it forms but one tenth of our *total* commerce. Make a list of our chief exports. The greatest of our imports are sugar, from the West Indies, and coffee, from South America. Other leading imports are:

- | | |
|------------------------------------|-------------------------------------|
| 1. Cloth—woolen, silk, and cotton. | 4. Raw fibers—flax, wool, and silk. |
| 2. Iron and steel goods. | 5. Hides and leather. |
| 3. Drugs and chemicals. | 6. Raw India rubber. |

Fully three fourths of the merchandise which enters into the commerce of this country is transported by railroad, and but one fourth by



boats on the oceans and lakes which border the country, or on the rivers and canals which traverse it. In what waters does most of the transportation by boats take place? Nearly half of the world's length of



railroad is in the United States. Which quarter of the country is most completely supplied with railroads? Which quarter has the next greatest

supply? How does the distribution of railroads compare with the distribution of population? (map, p. 57.) How do the Appalachian Mountains affect the distribution of railroads? How do the Ozark Mountains? Do you think that these mountains have been hindrances to the carrying trade? In which quarter of the United States do you think the industry of commerce is greatest? Why?

Wealth. The value of the farms, houses, railways, and other improvements in the United States, together with the accumulation from all our industries, constitutes an amount of wealth much greater than that of any other nation.

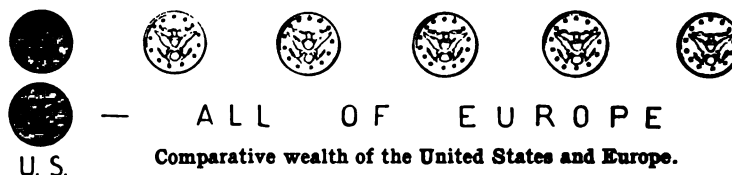
Europe contains a greater number of highly civilized people than any other grand division. How does the population of our country compare with that of Europe? (p. 157.) How does the wealth of the United



U.S. — ALL OF EUROPE

Comparative population of the United States and Europe.

States compare with that of the whole of Europe? (p. 159.) The wealth of the United States, if equally divided, would yield to every man, woman, and child in the country \$1246; while the wealth of Europe would yield to every person in that grand division only about \$683. Hence, in proportion to its population, this country is about twice as wealthy as Europe.



Earnings. Not only the accumulated wealth but the daily earnings in this country are far greater than in any other nation. This is due principally to the fact that we use labor-saving machinery in all the great industries to a greater extent than any other people. Therefore, one man in this country can produce as many things in a given time as several men can produce in any other country. Since a man can produce more, wages are higher here than elsewhere, and the earnings of the people are very great.

A little less than half (forty-five per cent) of the people of the United States earn money. If the total earnings in our country were divided equally among the money-earners, each one would receive \$1.50 for each week day in the year; while an equal division of the earnings of Europe would yield but sixty-seven cents a day to the money-earners of that grand division. It is this great difference in the earning power of men in the two regions that has caused so large and rapid an emigration of people from Europe into the United States.

Supplemental Work. From the tables on pp. 157, 159, prove that the figures given for the average wealth and earnings here and in Europe are correct. If each money-earner in your family received an equal share of the earnings of the country, what would the income of the family be? Read chapters 5, 10, and 12 in "Children's Stories of American Progress." Read "Travels in America One Hundred Years Ago," by Thomas Twining. Read sections 280 to 286 and chapter 22 of McMaster's "School History of the United States."

COMMERCIAL AND INDUSTRIAL SUBDIVISIONS.

Review the lesson on longitude (p. 7) and study the supplemental work following it. In about what longitude is Philadelphia, in Pennsylvania? St. Louis, in Missouri? Denver, in Colorado? San Francisco, on the Pacific coast? When the rotation of the earth brings the meridian of Philadelphia exactly beneath the sun, what time is it at Philadelphia? How long must the earth then rotate before the meridian of St. Louis is brought exactly beneath the sun? How long before the meridian of San Francisco is brought to that position? When it is noon at Philadelphia what time is it at St. Louis; at Denver; at San Francisco?

Standard Time Belts. The main body of our country is so broad from east to west that more than three hours are required for rotation to carry it past the sun. Hence, if we are told that a railroad train starts "at noon," we cannot be sure of its time of starting, because it is noon at different places in our country for more than three hours after that time occurs on the Atlantic coast.

To avoid mistakes, delays, and confusion, the railroad companies of the country have adopted the times of the meridians of 75° , 90° , 105° and 120° , as the standards by which to run their trains. Thus, on most of our Atlantic coast the standard time of all the railroads is that of the meridian of 75° and is called "Eastern time"; throughout most of the Mississippi valley the standard is that of the meridian of 90° , and is called "Central time"; in the Rocky Mountain region the time of the meridian of 105° is standard for the railroads and is called "Mountain time"; and on the Pacific coast the standard is the time of the meridian of 120° and is called "Pacific time."



What is the difference in time between each two of these "standard" meridians? When it is noon by standard time in the Central time belt, what time is it in the Mountain belt; in the Eastern belt; in the Pacific belt? Thus, if a traveler's watch marks railroad time in one part of the country, he can easily tell from it the correct railroad time in any other part by adding or subtracting the proper number of full hours.

Each railroad company suits its own convenience as to the point on its line where a change of standard time is made. It is usually at some station where the locomotives and train men are changed; and as such stations on different roads are seldom on the same meridian, the edges of the time belts are irregular. In the extreme southwest, Mountain time is not used, but a change is made from Central time directly to Pacific time. What is the amount of this change? At what city is it made?

International Date Line. Suppose that two men, starting from the prime meridian on Monday noon, travel the one eastward and the other

westward, each traveling just as fast as the earth rotates. The man who goes west as fast as the earth turns east keeps exactly beneath the sun all the time, and it seems to him to be still Monday noon when he reaches his starting point again twenty-four hours later. He has *lost* a day in his reckoning by traveling westward around the earth.

The other man travels eastward over the earth as fast as the earth itself turns eastward, and therefore he moves away from the sun twice as fast as the prime meridian does. After twelve hours' travel he reaches the meridian of 180° , but twelve hours' rotation has carried this meridian beneath the sun, and so the traveler reaches it at noon. In twenty-four hours the man reaches his starting point on the prime meridian, but twenty-four hours' rotation has brought this meridian beneath the sun again, so the traveler reaches it on the second noon after his start; he therefore supposes it to be Wednesday noon, though really it is but twenty-four hours after Monday noon. He has *gained* a day in his reckoning by traveling eastward around the earth. To correct such errors in their dates, navigators usually add a day to their reckoning when they sail westward across the meridian of 180° , and subtract a day when they cross it to the eastward, and for this reason the meridian of 180° is sometimes called the *International date line*.

Industrial Sections. We have seen that, owing largely to differences in surface structure, climate, and soil, the



great productions of our country are confined more or less definitely to different regions. Hence the United States may be naturally separated into (1) the Northeastern, or cloth-manufacturing section; (2) the Northern, or food-, iron-, and coal-producing, and manufacturing section; (3) the Southern, or cotton-producing section; (4) the Plateau, or grazing and gold- and silver-mining section; and (5) the Pacific, or Western food- and gold-producing section.

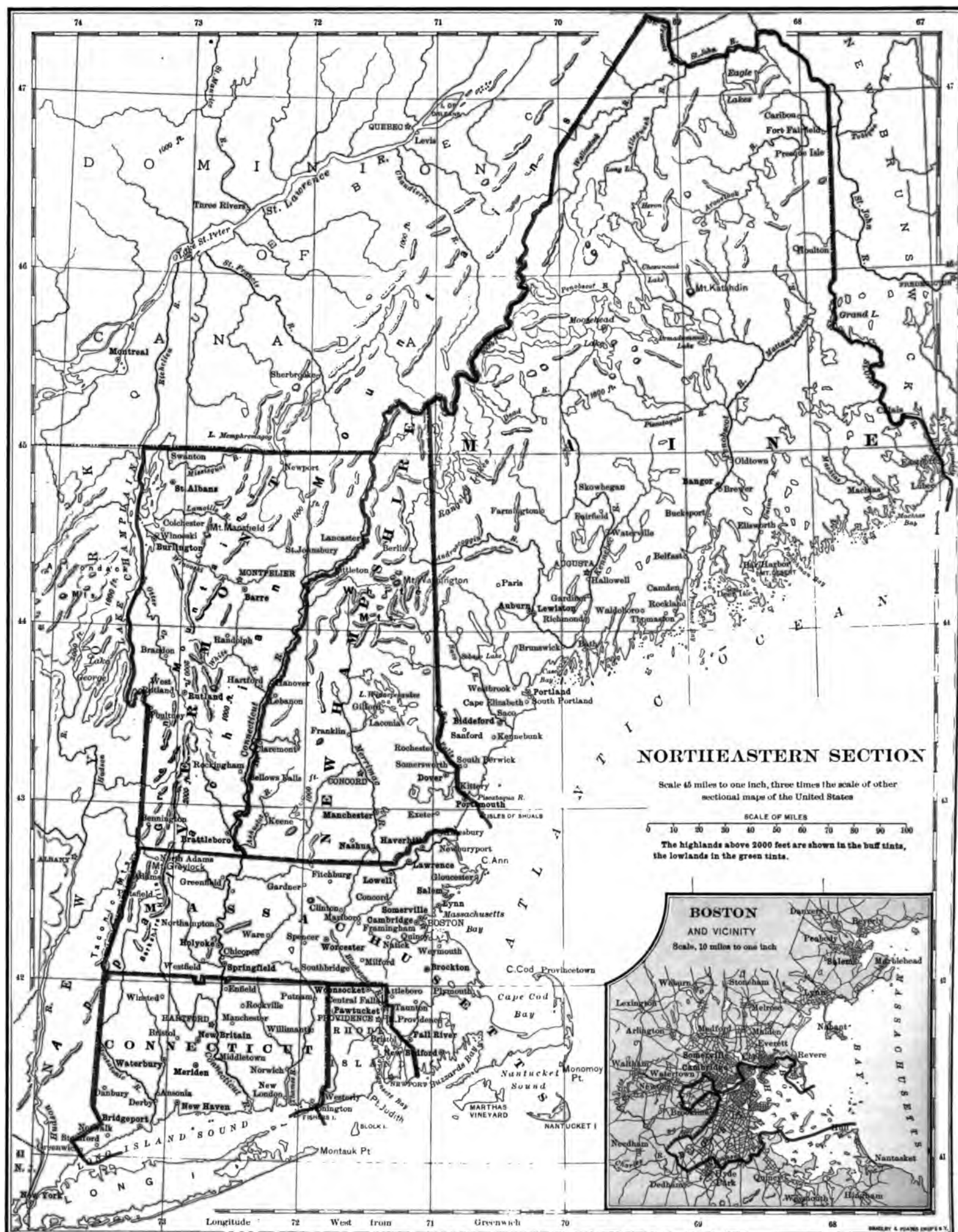
TOPICS ON RESOURCES AND PEOPLE.

I. PEOPLE. Races: Indians—number, location; negroes—origin, location, number; native whites—ancestors, distribution; white immigrants—attraction, origin, landing place, distribution. Population: amount; increase; distribution. Government: origin; Federal; state; territorial. Wealth: amount; reasons for; average earnings.

II. ADVANTAGES. Soil: alluvial; glacial. Climate: heat regions—northern, central, southern, western; extremes of temperature; length of winters; rainfall regions; influence of storms. Manufacturing facilities: streams; minerals. Transportation facilities: railroads; rivers.

III. PRODUCTS. Food: vegetable—region, amount, kinds; animal—kinds, regions, amount; manufactures. Fibers: vegetable; animal; manufactures from. Timber: regions; kinds; amount; danger. Minerals: regions; kinds; amounts.

IV. EXPORTS. Natural products: chief; second; other. Manufactured products.



THE NORTHEASTERN SECTION.

Which states compose this section? What large river basin is north of the Northeastern Section? What waters are south and east? In what latitude is the central part of this section? How does the distance of the section from the equator compare with its distance from the north pole? What highland region is in these states? Locate the Green Mountains; the Berkshire Hills; the White Mountains; Mount Katahdin. Locate the chief lakes. How were the lakes mostly formed? Name the chief rivers, and locate their sources, courses, and mouths. What facilities do they afford for manufacturing? Name the states of the group in the order of their size.

The six states in the extreme northeastern part of our country are often called New England. They occupy a region less suitable for agriculture than is any other portion of the eastern lowlands. The larger river valleys of the section are fertile, but over most of the uplands the soil is thin and unproductive, and is covered with glacial boulders. Hay, apples, and potatoes are raised in the valleys, and market gardening and dairying are carried on; but not nearly enough food is raised to supply the wants of the people, and the section is supplied with grain and meat from the West. In the northern part are extensive forests.

The chief occupation is manufacturing. Why are waterfalls specially numerous in this region? (p. 50.) Since in this section the hard rocks of the Piedmont region extend to the seacoast, many of the falls and rapids afford water power for manufacturing near good harbors, where raw materials may be received, and the manufactured goods shipped. The greater part of the manufacturing, however, is now done by steam power, most of the coal, for fuel, being brought by sea from the ports of Chesapeake and Delaware bays.

Because there are few mines of coal or iron in the section, the articles manufactured are those whose value depends upon the ingenuity and fine workmanship displayed in making them, rather than upon the amount of fuel and raw material used. The chief manufactures are cotton and woolen goods and boots and shoes, of which this section produces more than all the rest of the country. Other characteristic manufactures are paper, light hardware, fine machinery, clothing, jewelry, and rubber goods.

New England, especially the southern half, is thickly covered with a network of railways, which connects it



Bar Harbor, Mt. Desert Island, Maine.

with the south and west, and also with the railway systems of Canada. The glacier-carved fiords and bays of the New England coast contain many fine harbors, from which vessels carry on an active coast or fishing trade; and Boston maintains a large foreign commerce.

About half the granite and marble, and much of the slate, used in the country are quarried in New England.

New England contains the most densely peopled part of the United States. How does this section compare with the rest of the country in the distribution of cities and towns? (p. 59.) More than half the people live in cities.

These states have a well-educated and energetic population, and fine school systems. They contain several of the oldest and most noted colleges in the country.

The population of the beautiful mountain and lake regions of this section, as well as that along the seacoast of nearly the whole of New England, is much more than doubled during the summer months by the thousands of people who, at that season, leave their regular occupations in the crowded cities of the eastern part of the Union for a period of rest and recreation. The care of the "summer boarders" is an important occupation throughout these regions.



The beach at Newport, R. I.

MAINE. What natural boundaries has Maine? By what political divisions is it bordered? How does it compare with the rest of New England in size? Turn to the map of the United States (p. 56) and compare it with New York in size; with Texas. Describe its surface; its rivers; its coast. Name and locate the capital and the five chief cities.

About one half of the surface of Maine is covered with forests of pine, spruce, hemlock, and birch, which supply lumber and material for wood pulp used to make paper. Hay, oats, potatoes, and apples are the most important farm products. Maine is one of the foremost granite-producing states, and yields much slate. The fiords of the rocky coast form good harbors. Along the shore, herring, sardines (p. 39), and cod are caught, and there are many sardine-packing and herring-smoking establishments.

Portland, the chief seaport and most important city, is the terminus of the principal railway system of eastern Canada. It has an important foreign commerce when the St. Lawrence is frozen. The harbor is among the largest and finest in the country. Boots and shoes are manufac-

tured, and much ice and fish are exported. *Lewiston* manufactures cotton and woolen goods. What city is just opposite? *Auburn* has large boot and shoe factories. *Bangor*, at the head of navigation on the Penobscot, is one of the great



Crawford Notch, White Mountains, N. H.

lumber depots of the country. *Biddeford* has large cotton mills. *Augusta*, the capital, manufactures cotton goods and shoes. *Bath* is the shipbuilding center.

NEW HAMPSHIRE. What natural boundaries has New Hampshire? What political boundaries? How does it compare with Maine in size? What two rivers drain the larger part of it? What mountain group is in the north? Name the chief peak. Name and locate the largest lake; the capital; the seaport; three other cities.

Because of its beautiful mountain scenery New Hampshire has been called the "Switzerland of America." The forests and the granite quarries give rise to important industries. The state ranks third in the country in cotton manufacture. This is centered chiefly at *Manchester* and *Nashua*, which are located at falls on the Merrimac. *Concord*, the capital, also has cloth mills, wagon and carriage factories, and fine granite quarries. The fine water power at *Dover* is utilized by large cotton and woolen mills.

VERMONT. What lake and river form nearly half the boundary of Vermont? What states and country border it? Compare Vermont with New Hampshire in shape; in size; in surface. Has Vermont a seaport? Why? Draw the main divide of the state. Name and locate the mountains of Vermont; the capital; the five chief cities and towns.

Vermont means "Green Mountain." The rounded summits of this mountain range are covered with forests of evergreen pines and spruces. There are many fine dairy farms and sheep ranges. Much hay is produced, and fine breeds of live stock are kept. Lumber is obtained from the forests, and more maple sugar is produced than in any other state. Over two thirds of the marble quarried in the United States, and much granite and slate, come from

Vermont. Less cotton goods are made than in the other New England states. Why? Lumber, woolens, musical instruments, and scales are manufactured. There is considerable trade with Canada through Lake Champlain.

Burlington, the chief city, has a fine harbor and is an important lumber market. Near *Rutland* there are extensive marble quarries; *St. Albans* is a center for dairy products; in *Brattleboro* organs are made; and *Barre* has fine granite quarries.

MASSACHUSETTS. By what states and waters is Massachusetts surrounded? Turn to the map of the United States and compare with New Jersey in size; with New York; with Texas. Describe its coast; its surface. Name and locate its mountains; rivers; capes; bays; islands. Name and locate its capital; four other seaports; three cities on the Merrimac; two on the Connecticut; three other large cities.

Massachusetts, although one of the smallest, is one of the wealthiest and most thickly settled states of the Union. Manufacture and commerce are the leading industries. In this state are manufactured

half of the boots and shoes and a very large part of the cotton and woolen cloth and of the paper made in the United States. The commerce, both foreign and domestic, is very large. Many vessels enter the harbors, and the eastern part of the state is thickly intersected by railroads from the north, the west, and the south.

Massachusetts is foremost among the states of the Union in the quarrying of granite and in the value of cod fisheries.

Boston owes its growth and importance chiefly to the great size, depth, and excellence of its beautiful island-studded harbor at the head of Massachusetts Bay. It has become the great commercial center for nearly the whole of New England, receiving and distributing throughout the section raw materials,—wool, cotton, hides, leather, rubber, and coal,—and receiving in return manufactured goods for distribution by sea or by railroad.



Paper mill, Holyoke, Mass.



Public Library, Boston, Mass.

Though not particularly noted for the characteristic manufactures of the section,—cloth and boots and shoes,—Boston is one of the great manufacturing centers of the United States; the making of clothing and fine machinery and the printing of books are leading industries.

Boston is among the oldest of the great cities of the country, having been founded by the Puritans in 1630 on a small peninsula between the estuary of the Charles River and the harbor.

The peninsula contained three low hills, from which it got the name "Trimountain" (or Tremont). Between these hills and the mainland were wide salt marshes which were flooded by the tides, so that at high water the penin-



Making Britannia ware, Meriden, Conn.

sula was connected with the mainland only by a long, narrow "neck" of land. On the highest of the hills was built the Statehouse, which commands a fine view over the city and harbor. The people long since widened the neck by filling up the marshes, so that it no longer resembles an isthmus.

The newly made land and much of the mainland over which the city has spread have become fine residential quarters, while most of the old peninsula is given up to business. On the east front, where the water is deep, are the great docks where foreign commerce is carried on; the estuary of the Charles, to the north, is used more for the coast trade. Nearly the whole railroad system of the section also radiates from this city.

Because of the fine schools, colleges, and libraries there, and the great number of authors, musicians, and artists who have lived in or near the city, the citizens often call Boston the "Athens of America."

Worcester is a great railroad center, and is noted for the manufacture of machinery, shoes, and wire. At *Cambridge* is located Harvard University, the oldest and one of the largest in the country. *Fall River*, *Lowell*, and *New Bedford* are the great centers of cotton manufacture; *Lawrence*, of both cotton and wool; *Lynn*, *Brockton*, and *Haverhill* make millions of boots and shoes; and at *Springfield* is a United States arsenal, where firearms are made. *Holyoke* has large paper mills. *Gloucester* is a great fishing port. *Salem* has large tanneries.

A shoe factory, Lynn, Mass.



Spinning in a cotton mill, Fall River, Mass.

CONNECTICUT. By what states and waters is Connecticut surrounded? Describe its surface; drainage; coast. Name and locate its capital; its chief cities.

Much tobacco is grown in the Connecticut valley; and in the western and southern parts of the state dairying

and the raising of vegetables and seeds are important industries. In Long Island Sound many oysters are dredged.

The state has valuable sandstone quarries and is especially noted for the variety of its manufactures.

Besides cotton and woolen goods, almost every kind of fine cutlery and hardware, ingenious tools and machinery, needles, pins, hooks and eyes, clocks, firearms, bicycles, sewing machines, and all kinds of brass and plated ware, come from the factories of this state.

New Haven is the largest city and chief port. It is the seat of Yale University, one of the most famous in the country. *Hartford* is the headquarters of many insurance companies, and is noted for firearms, bicycles, and rubber goods. *Bridgeport* manufactures carriages and sewing machines; *Waterbury*, brass work, clocks, and pins; and *Meriden*, silver and plated ware. *New Britain* makes locks and builders' hardware.

RHODE ISLAND. Describe the position of Rhode Island; its drainage. Turn to the map of the United States and compare its size with that of Delaware; with

that of Texas. Name a bay, a cape, and a river of this state; its capitals; two other cities.

Rhode Island is the smallest and most densely populated of all the states, and in proportion to its size has more manufacturing than any other.

Providence, the second city in New England, contains the largest cotton factory in the world, and exceeds all other cities in this country in the manufacture of jewelry. It also has many woolen mills. *Pawtucket* and *Woonsocket* also are centers of cotton and woolen manufacture. *Newport* is a famous summer resort.

Supplemental Work. Tell one anecdote of Revolutionary times in New England. Read "A New England Girlhood," by Lucy Larcom, or "A New England Boyhood," by E. E. Hale. Read or recite one selection from Vols. 25 and 26 of "Poems of Places," edited by Longfellow. Describe as fully as Boston is described one other city or place in New England. Write next day what you remember of the description given by one of your schoolmates.



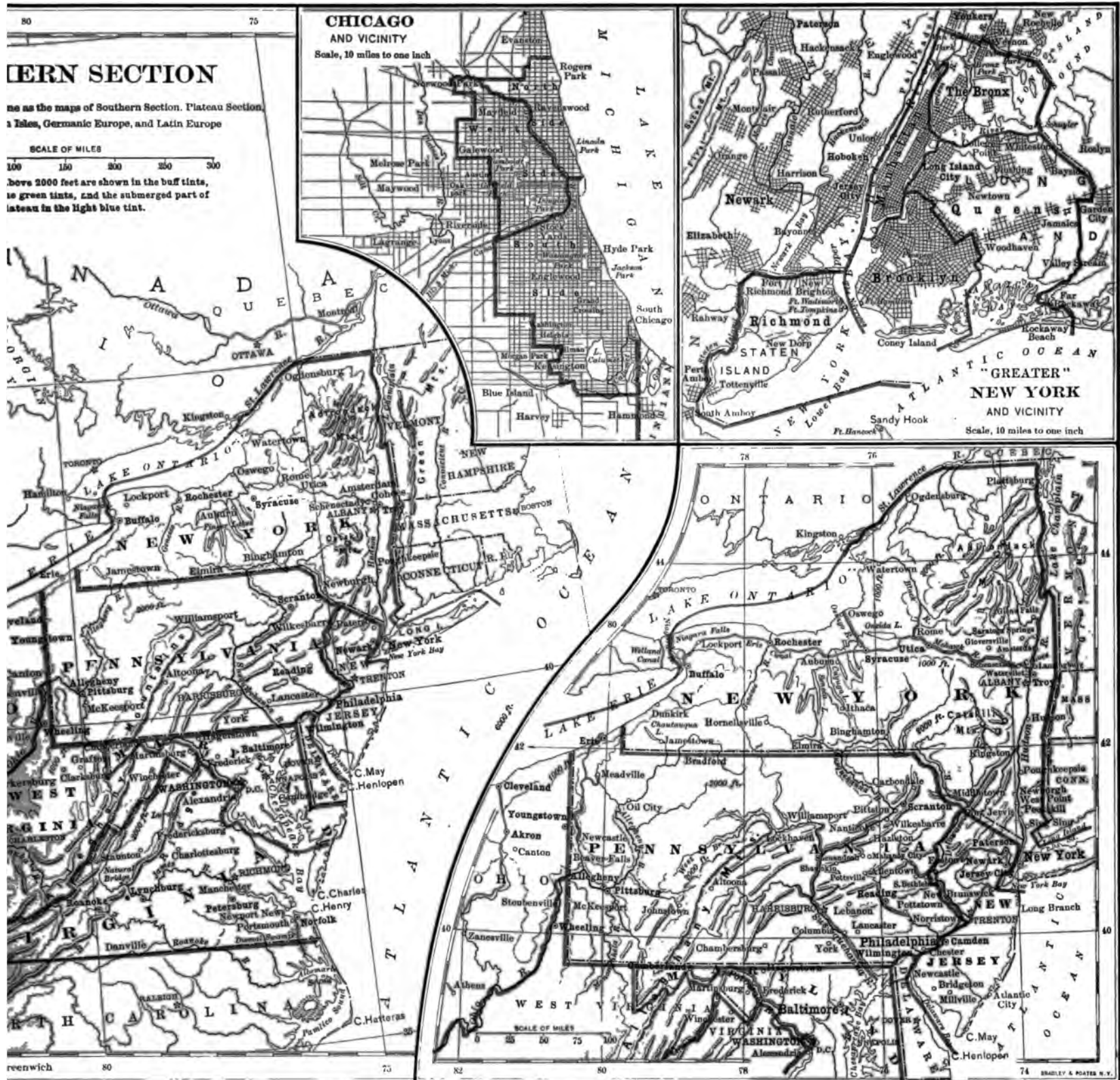
THE NORTHERN SECTION.

Which states of this section are crossed by the Appalachian Mountains? Which state lies wholly in the Atlantic plain? Which states lie between the Appalachian Mountains and the Mississippi River? Which states lie mostly in the Lake plains? Which lie mostly in the Prairie plains? Which lie partly in the Great Plains? Which quarter of the United States embraces most of the Northern Section?

Although snow lies on the ground in winter for a month or more throughout the greater part of this section, and the winters in the northwest are long and cold, the summers in nearly all parts are warm enough, and have sufficient

rainfall, for the most useful grains to grow and ripen. Except in the Appalachian Mountains, the surface is generally smooth and flat, and the soil nearly everywhere is deep and fertile, the old Laurentian glacier having deposited detritus in this section instead of having scraped it off into the sea, as in New England.

Because of these advantages, agriculture is the most important industry, and because of the use of improved agricultural implements, by which one man here produces as much as four or five men in any foreign country, this has become the greatest food-producing region of the world.



In every state of the section, and especially in the states of the Prairie plains and the Lake plains, the chief food crops for man and beast—wheat, corn, oats, hay, and potatoes—are raised in enormous quantities, so that about five sixths of our country's yield of all these articles comes from these states. Other food crops of lesser importance are grown, as well as the bulk of the tobacco crop of the United States.

Domestic animals are largely dependent upon the crops for food, and hence most of the hogs, cattle, and butter and eggs produced in the country come from this section.

On the Atlantic coast of the section occur the greatest oyster fisheries of the United States.

Where are the most heavily forested parts of the section? (map, p. 59.) In all these regions lumbering is an important industry. The pine belt of the Great Lakes is one of the greatest timber-producing regions of the Union.

Where are the largest coal fields of the country? (p. 59.) Where is the principal petroleum region? Where is most of the iron ore of the country produced? In what part of this section are there rich copper mines? There are valuable lead and zinc deposits west of the Ozark Moun-

tains. In all these regions mining is an extensive industry.

Mention the important food crops and two very important meat products for which this section is noted; two other important raw vegetable materials; the most important mineral products.

From the city map on p. 59 locate the great manufacturing region of the United States. What part of this section does it embrace? In the Northern Section the manufacture of the raw materials produced in the section—food, lumber, and iron and steel—forms the bulk of the manufacturing industry.

Throughout the grain- and meat-producing regions of the central part of the section, flour milling and the packing and curing of meat are characteristic industries. In the region bordering the Great Lakes and on the Alleghany plateaus are the great sawmills of the country, while the iron and steel industries are centered at points where coal and iron ore, with limestone for flux, can be most cheaply brought together. The manufacture of tobacco is also very important in this region, especially in the southern and southeastern parts. East of the Appalachian Mountains the manufactures are more varied and, like those of New England, consume much raw material not produced in the section. Why? The weaving of cotton, wool, and silk, and the refining of sugar, are extensive industries of this kind.

What three bays indent the east coast of this section? How were they formed? They are all deep enough for the largest vessels, and contain the best harbors on our Atlantic coast south of New England. What river flows into New York Bay? What one flows into Delaware Bay? Name the two largest that flow into Chesapeake Bay. These four rivers rise west of the Appalachian ridges and cross the ridges in a series of deep water gaps, while south of the Potomac River, Blue Ridge rises as an almost continuous wall between the coast and the Mississippi valley. Turn to the railroad map (p. 60) and tell what effect this peculiar Appalachian drainage has had upon the railroad system of the country. Thus the seaports on the three bays of this section are among the



Niagara Falls.

est cataracts in the world. As the falls interrupt the navigation of the river, the Welland Canal has been constructed between the lakes, through Canada. Canals have also been constructed in Canada around the rapids of the St. Lawrence River to tidewater at Montreal. But the mouth of the St. Lawrence is so far north that it is closed by ice many months in winter, and besides is in Canada. Advantage has been taken of the water gaps and the low valley of the Hudson to construct the Erie Canal from that river to Lake Erie, thus securing a most important water route through our own country from the Great Lakes to tidewater.

The Mississippi, Ohio, and Missouri rivers are navigable for great distances, and many of their larger tributaries for shorter distances, and are much used for transporting coal, lumber, and other bulky freight. Several canals have been constructed through the low divide to connect the Great Lakes with the Mississippi system.

The Northern Section contains about two thirds of all the people in the United States, and nearly three fourths of all the foreign immigrants in the country.

The Northern Appalachian States. The seven states of this section which are crossed by the Appalachian region or the Atlantic plain are sometimes called the "Middle States." A very large part of our coal and petroleum, and much iron ore, come from this region. Manufacturing and the production of food crops are more important in the northern part, while the production of oysters and tobacco are of great importance in the southern.

NEW YORK. What states and country border New York? What three lakes form part of the boundary? What river system drains the northern part? Trace its divide across the state. To what great river system does the southwestern part drain? In what slope is the southeastern half of the state? Name and locate the mountains of New York; the islands; the lakes. By what river are the Finger Lakes drained into Lake Ontario? What is the chief tributary of the Hudson? Name and locate the capital; the chief city; the chief lake port; a city on the Genesee River; three other large cities.



The Erie Canal at Lockport, N. Y.



Locomotive works, Philadelphia.

An oil well, Pennsylvania.



Rug weaving, Philadelphia.

PENNSYLVANIA. What states border Pennsylvania? Describe its surface. Trace across the state the principal divide. What two large rivers are on the eastern slope; on the western? Into what does each flow? Locate the capital; the chief city; two other important cities of the eastern slope; three of the western.

Pennsylvania ranks first among the states in the production of coal and petroleum, and second in population and the value of manufactures. Bituminous coal is found in the Allegheny plateaus, and anthracite coal in the rock folds of the ridges in the north-eastern part of the state. Petroleum is obtained in the Allegheny and Monongahela valleys.

The characteristic manufactures of the state, particularly of the western part, are iron and steel, which require much fuel. In this industry Pennsylvania exceeds all the other states combined. In the eastern part of the state, the weaving of woolen, cotton, and silk, and the making of engines and machinery are important industries.

From the timber-covered mountains lumber is floated down the rivers to the sawmills and planing mills, and with the oak and hemlock bark much leather is tanned in the northwestern half of the state.

The soil of the valleys and of the eastern lowland is fertile and gives to Pennsylvania a high rank as a wheat-growing and dairying state.

The water gaps through the Appalachian ridges have made the state the great railroad thoroughfare between the seaboard and the upper Mississippi valley. Canals connect the bituminous coal regions with Lake Erie and the anthracite coal regions with New York, Delaware, and Chesapeake bays.

Philadelphia is the third city in the Union in population. It was founded about fifty years later than New York or Boston, and for a long time it was called "The Quaker City." Why? It was laid out between the Delaware and Schuylkill rivers near their junction, though it



Smelting furnaces, Pittsburg.

has now spread far west of the Schuylkill and along the Delaware for many miles. Ocean steamers ascend to its wharves, and the city exports much coal.

The nearness of the anthracite coal region makes fuel plenty and cheap, and Philadelphia has become one of the greatest manufacturing cities of the country.

Chief among its manufactures are woolen goods, carpets, and clothing. Sugar refining, and the making of heavy iron machinery,

locomotives, and steel steamships, are also important industries.

For over a century Philadelphia was the chief commercial city of the United States, but as the Central Lowland became settled the Erie Canal was made, and trade followed the natural route through the low Mohawk valley; so New York became the greater seaport.

Congress was in session in Philadelphia when it declared the independence of this country in 1776. After the Revolutionary War Philadelphia was the capital of the country for several years, and the Federal Constitution was prepared there. Independence Hall, in which the Declaration of Independence was made and the Constitution framed, is still standing and is much visited.

In Philadelphia is located the great University of Pennsylvania.

Pittsburg and *Allegheny* together form the great center of population in western Pennsylvania. They are in the heart of the bituminous coal, petroleum, and natural gas region. More than half the coke of the country, and one fifth of the iron and steel, are made in and near Pittsburg. This too is the greatest center in the world for the manufacture of plate glass. Allegheny has important tanneries.

Before the days of railroads these cities possessed the great commercial advantage of the river routes afforded by the Ohio and the two rivers which here unite to form it, and millions of bushels of coal are still shipped from Pittsburg down the Ohio.

Scranton is a mining center of the anthracite coal region. It is also a railroad center, and has large iron and steel works, breweries, and silk mills. *Reading* is

in a rich agricultural region, and receives by canal cheap fuel from the anthracite regions to supply its iron and steel works and foundries. *Erie* has a fine harbor and a large trade in iron ore, lumber, and coal. It has important iron works, foundries, and flour mills. *Harrisburg*, the capital, is located in a fertile region, and manufactures iron, steel, and railroad cars.

NEW JERSEY. Describe the situation of New Jersey. What two rivers and what bay form part of its boundary? Describe the coast. Locate the mountains; the capes; two canals; the capital; three large cities in the northern part; one in the western part.

New Jersey is one of the smallest states. The beaches of its seacoast are much resorted to during the summer. The state is crossed by two canals and many railroads, and



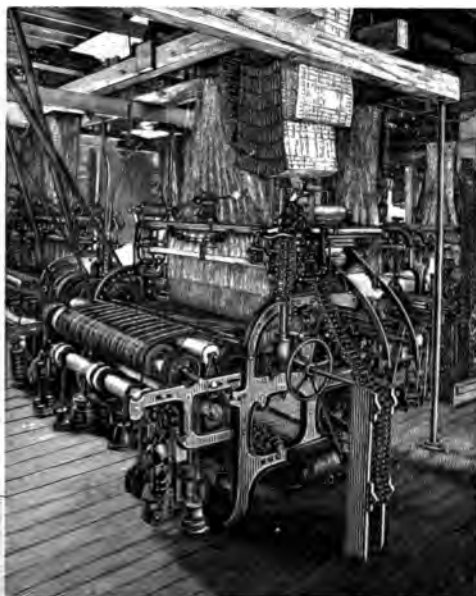
Naval Academy, Annapolis, Md.

the northeastern part is a great commercial and manufacturing region. The state ranks first in the manufacture of silk, pottery, and cast iron pipe. The making of leather and machinery, and the refining of petroleum, are important industries. Vegetables and fruits are raised in large quantities.

Jersey City is practically a part of New York city. It is the terminus of the railroads from the south and west, and is bordered by many steamship docks. It contains large chemical works and soap factories. *Hoboken* and *Bayonne* are continuous with Jersey City.

Newark refines metals and manufactures machinery, leather, and thread. In *Paterson* more silk is manufactured than in any other American city. *Trenton* is one of the leading pottery centers of the country. *Camden*, really a suburb of Philadelphia, manufactures oilcloths.

Silk factory, Paterson, N. J.



DELAWARE. Give the physical boundaries of the peninsula of which Delaware is a part; the political boundaries of Delaware. Compare it in size with New Jersey. Locate the capital; the chief city.

The northern part of Delaware belongs to the manufacturing region about Philadelphia; the southern part to the vegetable- and fruit-growing region, peaches being particularly excellent and abundant. The manufacture of the crates and baskets in which these products are shipped forms a common industry in the state.

Wilmington contains almost half the population of the state, and is noted for its car works, shipyards, and for the manufacture of leather and gunpowder.

MARYLAND. Compare the seacoast of Maryland with its bay coast. What other states own parts of the peninsula including eastern Maryland? What river forms most of the southern boundary of Maryland? By what states is Maryland bounded? Which part is in the Atlantic plain? Which is in the mountain region? Locate the capital; the chief city; one other city.

The short seacoast of Maryland is fringed with barrier beaches, but Chesapeake Bay contains many good harbors, and the chief oyster beds of the country. Fruits, vegetables, and tobacco are important products. In the western part of the state are valuable coal mines.

Baltimore is one of the cities that has grown up on the Fall line. Its fine harbor, in the estuary of Patapsco River, is nearer the great grain fields of the Central Lowland than is that of any other Atlantic seaport, and to it the water gaps of the Potomac

River afford a convenient route. For these reasons Baltimore has become one of the great food-shipping ports.

The making of clothing, the canning and preserving of fruit and vegetables from the surrounding region and of oysters from Chesapeake Bay, and the manufacture of tobacco, are the principal manufacturing industries. Baltimore is the seat of the famous Johns Hopkins University.

Cumberland has a canal to tidewater in the Potomac, and is the shipping point for the Maryland coal regions. It has important iron and steel works and foundries.

At *Annapolis* is the United States Naval Academy.

THE DISTRICT OF COLUMBIA. The District of Columbia was given to the United States by Maryland as a site for the national capital.

Washington, the most beautiful city in the Union, is situated where the Potomac River crosses the Fall line. Unlike most cities, Washington did not grow up from an irregular village, but a large capital city was planned



Gathering oysters, Chesapeake Bay.



A pottery at Trenton, N. J.



Glass furnace, Wheeling, W. Va.

before it was built at all; hence its streets are straight and broad. When the settled part of the United States was a narrow strip along the Atlantic coast, a position was chosen for its capital about midway between its northern and southern limits. Why was the location advantageous? Has it the same convenience now? For whom was the city named?

Not only do the President and the Vice President of the United States live in Washington, but there also reside the members of the President's Cabinet and the foreign ministers, who come to our country from all the nations of the earth to represent their governments and to look after the interests of their people. The senators and representatives meet in the Capitol (p. 55), and Congress is in session for several months of each year, making laws for the entire country.

Though Washington is built where water power can be obtained, and where navigation from the sea is possible, the city has little commerce or manufacturing, other than government printing. It has grown up simply as the national capital.

VIRGINIA. What states border Virginia? Trace through the state the divide of the Mississippi basin. Name three rivers of the Atlantic slope; two of the Mississippi slope. Locate two capes; the mountain ranges; the capital; the chief seaport; three other important cities.

More than half the people of the state are engaged in agriculture. Virginia ranks among the foremost states in the Union in the production of tobacco, and the peanut crop is the largest in the country.

There are valuable coal and iron mines. By means of the valleys and water gaps of the Kanawha, Roanoke, James, and Potomac rivers, several railway lines cross the mountains and convey coal and other products to the fine harbors of Chesapeake Bay. The Great Valley west of Blue Ridge is very fertile. In it are the caverns of Luray, and, farther south, the Natural Bridge. How were these formed? (p. 15.)

Richmond and *Petersburg*, on the Fall line, manufacture much tobacco. *Norfolk* has a fine harbor and is an important shipping point for coal, cotton, lumber, fish, and peanuts. A United States Navy Yard is located here. *Newport News* is also an important railroad terminus and seaport. *Lynchburg* is a great tobacco market.

WEST VIRGINIA. What rivers form part of the boundary of West Virginia? What is the eastern boundary of the state? Trace the main divide across the state. What river basin embraces most of the state? Locate the capital; three cities on the Ohio.

In the production of petroleum, coal, and natural gas, West Virginia is one of the foremost states. Much salt also is produced. There are extensive forests and fine grazing lands on the plateaus, while farming is pursued chiefly in the fertile lower lands farther west.

Wheeling, in the coal and gas region, manufactures iron, glass, and steel. What cities in Pennsylvania have the same industries? *Huntington* ships coal and lumber, and *Parkersburg* is in the oil region.

Supplemental Work. Tell one anecdote of the Dutch in New York, the Quakers in Pennsylvania, or the early settlers in some other northern Appalachian state. Read "Stories of New Jersey," by Stockton, "Stories of Pennsylvania," by Walton and Brumbaugh, "The Story of the City of New York," or of Washington, by Todd. Describe as fully as New York is described one other city in this section. Read or recite one selection from Longfellow's "Poems of Places," Vols. 27 and 28.

The Ohio Valley and Upper Lake States. The six states of this section that lie between the Appalachian Mountains and the Mississippi River are sometimes called the "East Central States." Through these states trace the divide between the St. Lawrence and Mississippi basins. Which states are in both basins? Which are in only one basin? A larger or smaller part of each of these states lies in the Prairie plains, and all are heavy producers of grain and meat. Which of them contain extensive forests? Which are in the coal region? (map, p. 59.)

OHIO. Give the natural boundaries of Ohio. What states border it? Name one tributary of Lake Erie; two of the Ohio. Trace through the state the main divide. Locate the capital; two lake ports; five other important cities.

Ohio has a very high rank both as a manufacturing and as an agricultural state, and it is the first wool-growing state in the Union. It ranks second in the production of petroleum and natural gas. The abundance of iron ore



Natural Bridge, Virginia.



Tobacco field, Virginia.

is one of the greatest food-producing states of the Union. The middle coal field underlies almost the entire state, and has enabled Illinois to take a very high rank as a coal-producing and manufacturing state. It has more miles of railroad than any other state, and is traversed by a navigable water route connecting the Mississippi River with Lake Michigan by way of the Illinois River and a canal across the low divide to Chicago.

Chicago is the largest city on the continent, except New York, and it is the greatest market in the world for meat and grain.

It was settled at the mouth of the little Chicago River, which rises so near a branch of the Illinois River that it was a favorite Indian route between the Great Lakes and the Mississippi valley. After both Cincinnati and Cleveland had been founded, the United States government built Fort Dearborn, where Chicago now stands, to protect the few traders from the Indians who were constantly passing to and from the portage. About this fort clustered many white men who came to trade. A flourishing city grew so rapidly that it now has about two million people. It stretches twenty-five miles along the lake front and extends several miles back over the prairies.

What conditions are necessary to the rapid growth and prosperity of a city? (p. 42.) Chicago is in the center of the greatest grain-growing and stock-raising region of the world, and the forests of the north are easy of access. There is an ample supply of coal in the region just south of the city, and from the shores of Lake Superior is received the best of iron ore. Its commerce may be carried on by way of the Mississippi River or the Great Lakes, or goods may be transported by railroads which enter the city from the north, west, and south, for Chicago has become the greatest railroad center in the world. As a result Chicago is not only a great commercial city but a great manufacturing center. Thousands of cattle and hogs are killed every day in the stock yards of the city, and loads of beef, pork, and other manufactured animal products are sent to all parts of the country. Tanneries along the river banks take the hides from the slaughterhouses and convert them into leather, and mills and factories change the timber of the North into planed lumber, sashes, doors, and furniture, railroad cars, and agricultural implements.

The iron ore from Lake Superior and the coal from the Illinois coal fields can be brought to Chicago so cheaply that this city has become one of the great iron- and steel-making centers of the country.

The University of Chicago, though one of the youngest, is one of the largest in the United States.

The business quarter borders the Chicago River, which flows through the city and forms the harbor, while the residence portion surrounds this quarter on the north, west, and south.

Peoria, on an expansion of the Illinois River called Peoria Lake, has great distilleries, stock yards,



Lumber yards at Chicago.

and meat-packing establishments, and manufactures agricultural implements and machinery. *Quincy* is a large trade center, and has extensive flour mills and iron foundries. *Springfield*, the capital, is an important coal-mining center. *Rockford* manufactures agricultural implements, furniture, and knit goods, and, like *Elgin*, has large watch works. *Joliet* has important iron and steel works and extensive limestone quarries.

KENTUCKY. What states border Kentucky? What three rivers form much of its boundary? In what drainage basin is the state? Name the principal rivers. Locate the capital; four important cities.

The most valuable crop is corn, but the state produces nearly half of the tobacco raised in the whole country. Hemp and sorghum are also characteristic crops. Kentucky raises much live stock, and is noted for its fine horses. It has iron and coal mines and



Stock yards at Chicago.

fine hard-wood forests. Mammoth Cave, in the central part of the state, is one of the largest caverns known.

Louisville, at the rapids or "falls" of the Ohio, is one of the largest tobacco markets in the world. A canal for river steamers is built around the rapids. The manufac-

ture of tobacco, distilling, brewing, meat packing, and tanning are leading industries.

Cornington and *Newport* are opposite Cincinnati and have similar industries. What are they? *Lexington* is the center of the stock-raising country known as the Blue Grass region.

MICHIGAN. What states farther east are in the same latitude as Michigan? By which of the Great Lakes is it bordered? Locate the Strait of Mackinac; the St. Marys River and Canal; Lake St. Clair; the capital; four other cities.



A blue-grass stock farm, Kentucky.

duces nearly all the flaxseed, or linseed, raised in the United States. What is made from linseed?

MINNESOTA. Give the boundaries of Minnesota. What three great river systems have their head waters in this state? Which system drains the greater part of the state? Locate the capital; three other cities.

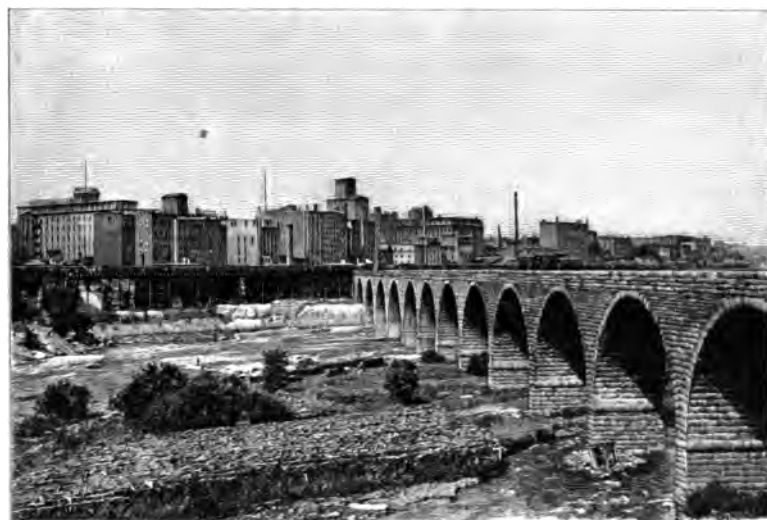
More than half of the state is forest-clad,—with pine in the north and with oak and other hard woods in the southwest,—and lumbering is an extensive industry. Yet Minnesota is the greatest wheat-producing state in the Union.

The flat valley of the Red River is probably the most perfect wheat-farming region in the world. During the glacial period most of this valley was a vast lake, upon the bottom of which sediment was deposited to form the fertile soil and level surface of the present wheat fields.

The iron mines in the northeastern part of the state are among the richest and most extensive in the world.

Minneapolis and *St. Paul*, though separate cities lying side by side, really form a single center of population and one of the ten greatest commercial and manufacturing centers in the country.

In 1819 the United States built Fort Snelling at the mouth of the Minnesota River, at the head of navigation in the Mississippi, and a few miles below the Falls of St. Anthony in that river. No town could be built until the government had bought the region from the Indians. When this was done, about twenty years later, a settlement was made at the falls. Emigrants from New England soon settled there and built sawmills and flour mills, and thus grew the greatest flour-milling and



Mills at Minneapolis below the Falls of St. Anthony.

one of the greatest lumber-milling cities in the world. It was well called Minneapolis (water-city), since its location, growth, and greatness depend largely upon the water power of the Falls of St. Anthony.

About the same time that Minneapolis was settled, Father Gaultier built on the banks of the Mississippi, opposite Fort Snelling, the little log chapel of St. Paul, which gave its name to the settlement of French and Swiss Canadians that sprang up around it. Later came many Germans and emigrants from Ohio and Pennsylvania, and thus grew the great commercial city and state capital at the head of navigation on the Mississippi.

Duluth, at the head of navigation on the Great Lakes, forms, with the city of Superior opposite, another center of population. It has a fine harbor and great docks and elevators. It is at the eastern end of a railroad to the Pacific, and ships wheat, flour, lumber, iron ore, and copper. *Winona* has a large trade in lumber and wheat.

IOWA. What rivers form part of its boundary? What states surround it? Which three states of the Northeastern Section are within the parallels that bound Iowa? How does Iowa compare in area with these three states? Locate its capital; four other cities.

Iowa produces more corn, oats, hay, and hogs than any other state in the Union, and it is among the first in the



Harvesting oats, Iowa.

production of barley, potatoes, cattle, and dairy products. It yields more bituminous coal than any other state west of the Mississippi.

Des Moines, the capital, is an important railroad and trade center in a mining and rich grazing region.

Dubuque has large lumber mills, carriage factories, and meat-packing establishments. *Davenport*, with Rock Island and Moline opposite, forms an important center of trade and manufacture. It is a great grain market, and manufactures lumber and flour. *Sioux City* has large meat-packing establishments, and is an important trade center. *Burlington* has many lumber mills.

MISSOURI. What rivers form part of the boundary of Missouri? What states surround it? What mountains are in the state? Locate its capital; its four chief cities.

On the rolling prairies of the northern half of the state the raising of grain, sorghum, and cattle and hogs is the chief occupation, while in the forest-covered plateau of the Ozark Mountains the production of fruit and wool, and lumbering, are important industries. Much coal is mined in the northern, central, and western parts of the state. The greater part of the zinc mined in the country, and much lead, come from a small region including the southwest corner of the state.

St. Louis is the largest city in the Mississippi basin, and is exceeded in population by but three cities in the Union. It is one of the great commercial centers of the country, and the principal collecting and distributing point for the southwestern quarter of the United States.

St. Louis was settled by French fur traders from New Orleans, about the time France surrendered the eastern half of the Mississippi valley to Great Britain. The site was selected because of its central location and admirable facilities for river trade with all parts of the Mississippi valley. These advantages later made it a great railroad center, and are the reasons for its growth and prosperity. For forty years nearly all the settlers were French or Spanish, and it was not until after the United States bought the western half of the Mississippi basin in 1803, that ferries across the river were established at *St. Louis*, and English-speaking emigrants from the East began to settle there. The rapid



Growing corn, Nebraska.

building of railroads, and the development of the agricultural resources of the surrounding regions, have made St. Louis a great center for the collection and manufacture of farm products. The principal manufactures are malt liquors, tobacco, flour, and meat products.

Kansas City is an important receiving and distributing point for a large region to the west. It forms a center of population with Kansas City, Kansas. *St. Joseph* is noted for the making of men's shirts and overalls, and for flour milling. *Springfield* has important flour mills and a large local trade.

KANSAS. What states border it? What can you say of the altitude of the state? Name its two chief rivers; its capital; three other cities.

The surface of Kansas is a long, gradual slope, the western boundary being about half a mile higher than the eastern. In the west, cattle herding is the chief industry; in the east, farming. Explain this difference. Kansas ranks among the first four or five states in the production of corn, wheat, cattle, and hogs. There are important coal, zinc, and lead mines in the eastern, and salt mines in the central part of the state.

Kansas City is continuous with Kansas City, Missouri, the middle of a public street being the dividing line. The city ranks next to Chicago in slaughtering and meat packing, which are leading industries.

Topeka, the capital, has large flour mills. *Wichita* is in a wheat-growing and stock-raising region. *Leavenworth* is in the coal-mining region of northeastern Kansas.

NEBRASKA. How does Nebraska resemble Kansas in surface; in drainage? What states surround it? What river forms its eastern

boundary? What tributary of the Missouri drains most of the state? Locate the capital; one other large city.

Nebraska, like Kansas, lies on the long, gradual slope west of the Missouri River, down which the wide, shallow tributaries of that stream flow in broad but not deep valleys. The rainfall in the east is sufficient for very successful farming. The west is drier, but affords excellent pasturage for vast herds of cattle.

Omaha, with Council Bluffs and East Omaha in Iowa, and *South Omaha* in Nebraska, forms a single center of population, commerce, and manufacture. There are extensive breweries, works for smelting and refining silver ore from the Rocky Mountains, and very large meat-packing establishments.

Lincoln, the capital, is a trade center, doing a large distributing business in coal, grain, and live stock.

SOUTH DAKOTA. What states border it? What rivers form part of its boundary? In what part of the state is the greatest elevation of land? What river drains nearly the whole state? Compare the area of South Dakota with that of New England. Locate the capital and chief cities.

The surface of South Dakota is somewhat less smooth than that of Kansas and Nebraska. In the east are hills of glacial drift, and in the west there is a flat dome-shaped upheaval of rock, which has been gradually worn down

into a cluster of mountain ridges called the Black Hills. Here gold and silver are mined and a low grade of tin ore is found. In the east wheat and flaxseed are the most important crops.

Sioux Falls has fine water power, and is the railroad center of the state. *Deadwood* is the mining center in the Black Hills region.

NORTH DAKOTA. What states and country bound North Dakota? What river boundary has it? What three states does it resemble in surface? In what

two drainage slopes does North Dakota lie? Trace the divide between them. Locate the capital and chief cities.

Much of North Dakota east of the Missouri is covered with glacial drift. How was the Red River valley formed? Some of the wheat farms in this valley are thousands of acres in extent. Grazing and stock raising are important industries.

Fargo is at the head of navigation on the Red River, and is the center of several railroad lines. *Grand Forks* is in the rich wheat region.

Supplemental Work. Read chapter 21 of McMaster's "School History of the United States," and tell some anecdote connected with the history of this section. Read "Stories of Missouri," by Musick. Describe as fully as *St. Louis* is described one other city in the section. Read or recite one selection from Longfellow's "Poems of Places," Vol. 29.



Union railroad station, St. Louis.



Steam plow, Kansas.



THE SOUTHERN SECTION.

Which part of this section is highland? Which part is lowland? Which states contain part of the Appalachian Mountains? Which states lie partly or wholly in the Atlantic plain? Which lie partly or wholly in the Gulf plain? Which divisions are broken by the Ozark Mountains? Which lie partly in the Great Plains? Which quarter of the United States embraces most of the Southern Section? What kind of summers and winters prevail in this section? (map, p. 54.)

Long, hot summers and short, temperate winters prevail over nearly the whole of this section. Although snow sometimes falls in all the states, it soon melts. Over nearly the whole section the rainfall is abundant for purposes of farming. It is only in the extreme west that serious droughts occur.

The surface for a hundred miles or more from the coast

is quite flat, then occur the low Piedmont hills in the east, and the gently rolling plains in the west. The surface is rugged only near the Appalachian and Ozark ridges and near the mountains in the extreme west. The soil, though sandy toward the coast, is generally very fertile.

Agriculture is the great industry, and cotton is by far the most important crop (map, p. 58). More than one fourth of the farm land is devoted to the cultivation of this fiber, and this section is the world's greatest cotton-producing region.

Most of the ordinary or "upland" cotton is grown in a broad belt lying about one hundred miles from the coast, and stretching from Texas to North Carolina, with extensions up the valleys of the Mississippi and its great tributaries. The finest cotton, however, - that with the longest and toughest fiber, - comes from the sea islands along the Atlantic coast.



After cotton, corn is the most extensive crop of the section, particularly in the northern part, where wheat and tobacco are also grown, while from the southern part come all rice and cane sugar produced in this country, and many of the oranges. This section also produces most of the peaches and sweet potatoes raised in the United States. In the northern part, where grain is grown, many hogs and fine horses are raised, and in the western part, many cattle and sheep.

What part of this section is wooded? (map, p. 59.) Why are forests not found in the western part? In the northern part of the section, especially in the valleys of the Appalachian and Ozark Mountains, are our most extensive forests of oak, hickory, ash, poplar, and cottonwood. The forests of the coast plain are composed chiefly

of yellow or southern pine, which is a much harder wood than the white pine of the North. These forests not only yield valuable building lumber, but from the abundant pine sap are made great quantities of naval stores—pitch, rosin, and turpentine.

In what parts of this section are there coal fields? (map, p. 59.) Coal mines are worked in all these fields, but the most extensive are in the Appalachian and Ozark regions. Near the southern end of the Appalachians, so much iron ore is obtained that it has become the greatest iron-mining region in the country, after the Lake Superior region.

From the city map, on p. 59, how do you think this section compares with the northeastern quarter of the country as a manufacturing region?

Until about thirty-five years ago nearly all the labor in the Southern Section was performed by negro slaves. These slaves could plant and gather cotton and do farm work, but few of them were able to manage machinery; consequently very little manufacturing was then done in the South, nearly all manufactured goods used there, such as cloth, furniture, tools, and implements, being brought from foreign countries or the North in exchange for raw cotton. Since the Civil War, during which the slaves were freed, white mechanics have settled in the South, the negroes are becoming more intelligent, and manufacturing is becoming an important industry.

Cotton cloth is made at many places, especially in the eastern part of the section, and this branch of manufacture is rapidly increasing. Cottonseed oil is extensively made in the central and west central parts, and sugar in the Mississippi delta. Much iron and steel are manufactured in the iron-mining region, and there are many sawmills in the forest regions, and turpentine distilleries in the great pineries of the Southeast.

The coast of nearly the whole section is fringed with barrier beaches, and many of the inlets between them have narrow, crooked channels, often obstructed by shifting bars. Hence foreign commerce is not so great as on our northeastern coast, though much cotton and some coal and lumber are exported, and there is an active coasting trade in small vessels. Turn to the railroad map (p. 60), and notice that the railroads of the section are separated by the Appalachian Mountains into two groups. Where is the eastern group? The other group connects the Southwest with the northern part of the Mississippi valley on either side of the Ozark Mountains.

These two groups are connected by several lines across the Appalachians and around their southern end; but each group indicates the route taken by trade in its region: the Atlantic plain trading mostly with the northeastern part of the country, but the Southwest and lower Mississippi valley mostly with the great central prairie region.

Turn to the population map (p. 57), and tell how the density of population in this section compares with that in the northeastern quarter of the country. The Southern Section contains about one fourth of the people in the United States. There are very few foreigners; but about one third of the people are negroes, and in several of the states the negroes are more numerous than the whites.

NORTH CAROLINA. What states border North Carolina? To what two slopes does its drainage belong? Name the principal rivers. Name two mountain ranges; a mountain peak. What have you learned about this peak? Describe the coast, and tell the manner of its formation (p. 49). Locate the chief sounds; three capes. What part of the state is swampy? Locate the capital; the other chief cities.

Much of the Tidewater region of the state is swampy or covered with open pine forests. Rice, peanuts, sweet potatoes, and early vegetables are important crops in the light and sandy soils of this region. In the Piedmont region cotton, tobacco, corn, and wheat are raised, and the forest-covered mountains of the west yield much valuable hard-wood lumber.

The manufacture of cotton is increasing rapidly, the mills already consuming more cotton than is raised in the state. Other important industries are the manufacture of tobacco, lumber milling, and the distilling of rosin and turpentine.

Wilmington, the chief seaport of the state, is an important cotton market, and ships great quantities of lumber and naval stores. *Raleigh*, on the Fall line, has important cotton mills and tobacco factories. *Charlotte* is the great cotton-manufacturing center of the state. *Asheville*, the commercial center of the western part, is a famous health resort. *Durham* and *Winston* have large tobacco factories.

SOUTH CAROLINA. Between what two states is South Carolina? What river separates it from Georgia? Describe the surface. Which are its two largest rivers? Locate the capital; the other chief cities.

More than one third of the cultivated land is devoted to cotton. The swampy Tidewater region yields much rice, the state ranking second in the Union in this product. Much attention is given to the cultivation of early fruit and vegetables for the Northern markets. From the pine forests lumber and naval stores are obtained. A great deal of phosphate rock is dug in the Tidewater region, and shipped for use as a fertilizer. Cotton weaving, lumber milling, turpentine distilling, rice cleaning, and fertilizer making are the chief manufacturing industries.

Charleston has long been one of the leading cities of



Rice field, South Carolina.

the South. It owes its prosperity largely to its fine harbor. It was at Fort Sumter in this harbor that the first engagement of the Civil War took place. Much cotton, rice, lumber, and fertilizers are shipped from this port.

Columbia, the capital, is on the Fall line. Its fine water power is used by several large cotton factories. *Greenville* manufactures cotton cloth.

GEORGIA. What states border Georgia? What rivers form part of the boundary? What are the chief rivers of Georgia draining the Atlantic slope; the Gulf slope? What part of the state is drained by the Mississippi system? Trace the divides of these three slopes. Locate Okefinokee Swamp; the capital; the other chief cities.

Georgia is one of the leading cotton-growing states, and exceeds all other states in the yield of peaches. The crops of sweet potatoes, rice, and sugar are also large. The pine forests yield much lumber, and more turpentine



Turpentine distillery, southern Georgia.

and rosin than any other region in the world. There are valuable quarries of marble and granite in the north, Georgia ranking as second state in the production of marble. The fine water powers along the Fall line, and the coal and iron mines in the north, give Georgia a high manufacturing rank among the Southern states. The chief manufactures are cotton, lumber, and naval stores.

Atlanta, the capital, was destroyed during the Civil War, but has grown rapidly since, and is one of the greatest commercial cities and railroad centers of the South. It owes its prosperity largely to its location near the southern end of the massive Blue Ridge, and thus where communication is easy with the North and with both the eastern and western groups of Southern railroads. It has cotton mills and many other manufactories.

Savannah was the first place settled in the state. It was taken by the British during the Revolution and was the scene of fighting during the Civil War. It is eighteen miles from the ocean, but has one of the deepest harbors on the Southern coast. The first steamship to cross the Atlantic sailed from this port. *Savannah* ships much cotton, rice, and lumber, and more naval stores than any other port in the world.

Augusta and *Columbus*, on the Fall line, have many cotton mills. *Macon*, also on the Fall line, manufactures lumber and fertilizers.

FLORIDA. What states border on Florida? What waters? Name its chief bays; capes; rivers. Trace the main divide. Which slope embraces the greater part of the state? Locate the capital; the four chief cities.

The surface of Florida is everywhere low and flat, so that the streams are sluggish, and many of them have numerous lakelike expansions. The southern part of the peninsula has been formed by additions to the mainland of successive lines of coral reefs, or *keys*, that grew up in the warm, shallow water along the coast (p. 21). This part of the state is now mostly a great marsh called "The Everglades."

The raising of early vegetables and fruits, especially oranges; lumbering in the north; and the making of cigars from Cuban tobacco, are the chief industries. The mild climate has made the state a favorite winter resort for invalids.

Jacksonville, the business center of the state, exports lumber and oranges, and is a great winter resort. *Key West*, the most southerly city in the country, manufactures many cigars and exports sponges. *Tampa* is an important shipping point for southern Florida, and manufactures cigars. *St. Augustine* is the oldest town in the United States, and contains fine hotels for winter guests.

ALABAMA. What states border Alabama? What water boundaries has it? Trace the main divide of the state. What rivers drain most of the state south of the divide? Into what bay do they both flow? What river drains the northern part of the state? Into what does it flow? Locate the capital; the other chief cities.

Besides the great agricultural industry, which produces large crops of cotton, sweet potatoes, and corn, the industry of mining is very important. More coal is mined in



Rolling mills near Birmingham, Ala.

northern Alabama than in any other Southern state, and in the production of iron ore this state ranks next after Michigan and Minnesota. Iron ore, coal, and limestone

are found so close together in Alabama that iron can be very cheaply made, and the state has become the third center in the Union for its manufacture. Lumber milling is also an important industry.



Picking oranges, Florida.

Mobile, at the head of Mobile Bay, is the oldest large city in the section. It is a great cotton-shipping port, and has large lumber mills. *Birmingham* and *Anniston* are in the mineral region, and have many iron furnaces and rolling mills. *Montgomery*, the capital, is an important trade center.

MISSISSIPPI. What states border Mississippi? What water boundaries has it? What river in the western part of the state is really a large bayou of the Mississippi? By what river is the extreme northeastern part of the state drained? Locate the capital; the chief cities.



Picking cotton, Mississippi.

The broad flood plain of the Mississippi includes all the part of the state between that river and the Yazoo, and is one of the most fertile regions of the Union. Upon these alluvial lands is grown much of the great cotton crop. A larger proportion of the land is planted with cotton in Mississippi than in any other state. Lumbering is also an important industry.

Vicksburg is a cotton market and the largest city of the state. *Meridian* is the commercial center of eastern Mississippi. *Natchez* ships much cotton.

TENNESSEE. What states border Tennessee? What is its western boundary; its eastern? What plateau crosses the state? This is one of the Alleghany plateaus. What tributaries of the Ohio cross the state? Compare the slopes of the eastern and western parts of the state as indicated by these rivers. Locate the capital; the other chief cities.

Tennessee is divided into three regions by the Tennessee River and the Cumberland plateau. Cotton growing is confined chiefly to the western region. Much tobacco, fruit, corn, and stock are raised in middle Tennessee, and more wheat than in any other Southern state. East of

the plateau lumbering and the mining of coal and iron are important industries. Much beautiful variegated marble is also quarried in east Tennessee.

Tennessee is the foremost Southern state in manufacturing — the grinding of flour, lumber milling, the making of



Baling cotton, Memphis, Tenn.

iron and steel, and the manufacture of cottonseed oil being the leading branches of this industry.

Nashville, the capital, was founded during the Revolutionary War, at a salt "lick" or spring, where game was very plentiful, as buffaloes, deer, and other wild animals came to the place to lick the salt-incrusted rocks surrounding the spring. It soon became an important trading point because of its river route to the lower Mississippi and the upper Ohio, and, with the building of railroads, it became one of the important commercial cities south of the Ohio River.

Memphis was settled about eighty years ago on the high bluff overlooking the Mississippi River, from which De Soto discovered the river more than 350 years ago. The bluff is the important feature of the location, for south of this point for several hundred miles the river occupies the central part of its flood plain, and both banks are liable to overflow. Because of its safe landing, Memphis rapidly grew to be an important river port, and since the building of a great railroad bridge here across the mighty river it has become a noted railroad center. It has a large trade in cotton, and many machine shops, and it is the great manufacturing center for cottonseed oil.

Knoxville is the trade center for eastern Tennessee, and has foundries, rolling mills, and lumber mills. *Chattanooga* is in the coal- and iron-mining region, and manufactures iron and steel. It is near the head of the narrow gorge which the Tennessee River has cut through the Cumberland plateau, and which is utilized by several railroads; hence the city has become an important railroad center.

ARKANSAS. What states border Arkansas? What rivers form part of its boundaries? What great tributary of the Mississippi flows

through it? Name the mountains. In what direction does the state slope? Locate the capital and other chief cities.

Nearly one half of the state is occupied by the broad flood plains of the Mississippi and Arkansas rivers, whose fertile soil produces great crops of cotton, corn, and peaches. From the forest-covered uplands valuable hardwood timber is obtained, and excellent cottonwood and cypress from the fertile lower land. Coal and fine sandstone for whetstones are obtained from the rock folds in the western part of the state. South of the Ozark ridges, in the region of folded rocks, occurs a group of very celebrated hot springs, about which a town of hotels and hospitals has grown up to accommodate the invalids who come to bathe in the hot water.

Little Rock, the capital, has manufactures of cottonseed oil and lumber. *Fort Smith* is the center of the coal region. *Pine Bluff*, on the bluff forming the western margin of the great Mississippi flood plain, is a shipping point for cotton and lumber.

LOUISIANA. What states border on Louisiana? What waters? In what general direction does its surface slope? What is the largest tributary of the Mississippi in the state? What bayou flows to the Gulf from near the mouth of the Red River? Because of this bayou the mouth of the Red River is sometimes said to be the head of the Mississippi delta. What lake or arm of the Gulf is in the southeastern part of the state? Locate the capital; the chief city; one other city.

Fully half of the state lies in the flood plains of the Mississippi and Red rivers. The levees along these streams are anxiously watched when the rivers are rising. Why? The lowlands are traversed by many bayous, and contain great canebrakes and swampy forests. But in them are raised by far the greater part of the sugar cane grown in the United States, and more than half of the rice, while cotton growing is confined largely to the uplands. The



Cutting sugar cane, Louisiana.

chief manufacturing industries are sugar refining, lumber milling, and rice cleaning.

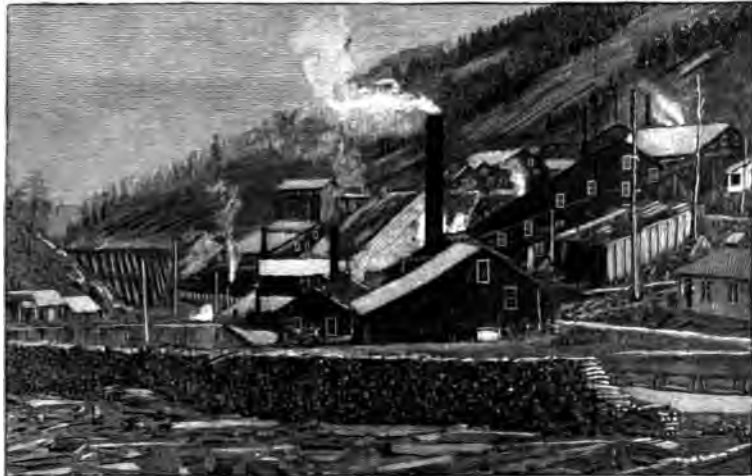
New Orleans, the largest city of the South, and one of the twelve greatest cities of the Union, lies on both banks of the Mississippi River, about one hundred miles from its mouth. Ocean vessels ascend the river to the city to



THE PLATEAU SECTION.

Which states of this section are crossed or bordered by the Rocky Mountains? Which states lie partly in the Great Plains? Which states lie partly in the Columbia plateaus? Which lie partly in the Colorado plateaus? Which lie partly in the Great Basin? Which half of the Union embraces this section? How does the rainfall in this section compare with that in the eastern half of the Union? (map, p. 54.)

This is the highland section of our country. The general surface is about a mile high, but the mountain ranges and many of the plateaus are much higher. Practically the only lowland in the section is in the extreme southwest.



Smelter near Anaconda, Mont.

Through the central part of the section the great Rocky Mountain chain extends from northwest to southeast, its numerous irregular ranges making this the roughest and most rugged part of the United States. Except in the extreme north and in the extreme south, the lowest passes across this chain have an elevation greater than the highest points of the Appalachian Mountains, while very many of the peaks reach heights of between two and three miles, where it is too cold for any vegetation to grow.

East of the mountains the section embraces a wide belt of the smooth but elevated surface of the Great Plains. In the great plateau region west of the mountains the surface is much broken by the deep canyons of the Colorado and Snake river systems; by lines of cliffs many miles in length; and by numerous detached mountain ranges formed by tilted blocks (p. 52). Between these ranges, cliffs, and canyons, however, the plateaus are smooth and nearly level.

On the highland the summer days are usually hot, but because of the elevation the nights are cool. The winters in the north are long and very cold, but the lowland in the south is one of the hottest parts of the United States. The winters there are mild and almost snowless, and in summer the temperature is sometimes 120°.

Only on the mountain slopes and on the highest plateaus is there enough rainfall to support forest growth. Elsewhere the section is so dry that irrigation is necessary for successful farming. In the Great Basin and southward the lower lands are true deserts. Much of the section, however, is covered with coarse bunch grass, which forms good pasturage.

By far the most important industry is the mining of the metals silver, gold, copper, and lead. This section

is the greatest silver-mining region of the world, and it produces more than half of the gold, copper, and lead mined in the United States. Enough coal to supply the wants of the section is mined from numerous small coal fields (map, p. 59).

The metal-bearing rock or ore is usually found as veins filling old cracks or fissures in the upheaved rocks of the mountains. Very deep mines are sunk in following the vein from which the ore is obtained. Often several different metals, particularly silver and copper or silver and lead, are found associated in the same vein. Though this is one of the great lead-producing regions of the world, the lead is obtained from silver ore.

After mining, herding is the most important industry. Vast herds of cattle find pasturage on the Great Plains, and thousands are annually shipped east to be converted into beef. Large flocks of sheep also pasture both on the Great Plains and on the high plateaus west of the Rocky Mountains. About one fifth of the wool produced in the Union comes from this section.

Some grain, vegetables, and fruit are produced for home consumption, but, with few exceptions, farming is confined

to lands that can be irrigated, either in the larger river valleys or near the base of the mountains, where the waters from mountain streams can be led over the land. The lower mountain slopes are covered with forests of spruce, fir, and bull pine, and here lumbering is carried on.

From the population map (p. 57) compare the density of population in this section



Sheep herding, Wyoming.

with that of the eastern half of the Union. There are not so many people in this whole section as in the state of New Jersey or of South Carolina. Compare the size of those states with that of this section.

Nearly one third of the Indians in the United States live in this section, and yet there are ten times as many whites as Indians. The Indians live in reservations which the government has set apart for them, and within which no one else is allowed to settle.

From the map on p. 60, compare this section with the eastern half of the country as to the number of railroads. Not many railroads are necessary in a sparsely populated region. In what general direction do most of the railroads of this section extend? Most of them are parts of trans-continental lines which connect the railroad systems of the East with the Pacific coast.

MONTANA. What states and country border Montana? What part is most mountainous? Trace the continental divide across the state. What two great rivers are east of the divide? What two rivers are west? To what are they tributary? What lake is in the northwest? Locate the capital; the other chief cities.

Montana produces more copper than any other state in the Union, and ranks high in the output of gold and silver. What state east of the Mississippi River produces much copper? (p. 75.) In the broad valleys east of the mountains more wool is produced than in any other state in the section; many cattle are raised; and crops of wheat and oats are grown. There are several Indian reservations within the state.

Helena, the chief commercial city, is in a rich mineral region. *Butte* is one of the great copper-mining



Entrance to the Garden of the Gods, Colorado.

centers of the world. *Anaconda* also has large works for the reduction of copper ore. *Great Falls* is an important manufacturing center.

IDAHO. What states and country border Idaho? What river drains the southern part; the northern part? What part is mountainous? To what physical region does Idaho belong? What is the character of its surface? Locate the capital.

The silver ores of the northern part of the state are rich in lead, and Idaho is one of the great lead-producing states in the Union; the yield of silver and gold is also large. In the north the rainfall is sufficient for the growth of wheat in the valleys and for fine forests on the mountain sides, so that both agriculture and lumbering are carried on. *Boise* is in an excellent grazing region.

WYOMING. What states border Wyoming? Trace the continental divide through the state. What three river systems have head waters in this state? What are the chief mountain ranges? Locate the Yellowstone Park. Name the capital; two other towns.

The raising of cattle and sheep, and coal mining, are the chief occupations in Wyoming. It is the only state in the section where coal mines are more valuable than the mines of the metals. Yet much ore is smelted along the transcontinental railroad which crosses the southern part of the state.

Cheyenne and *Laramie* are railroad towns and important collecting and distributing centers. *Rock Springs* is in the coal region.

The *Yellowstone National Park* has been reserved from settlement by the Federal government. It contains the most wonderful geyser region in the world, and hundreds

of hot springs whose basins are composed of beautiful mineral deposits from the cooling waters (p. 14). Besides these there are several beautiful lakes, the Great Falls and canyon of the Yellowstone River, and many lofty mountain peaks. It is visited every year by travelers from all parts of the world.



Yellowstone Canyon, Wyo.



Interior of silver mine.

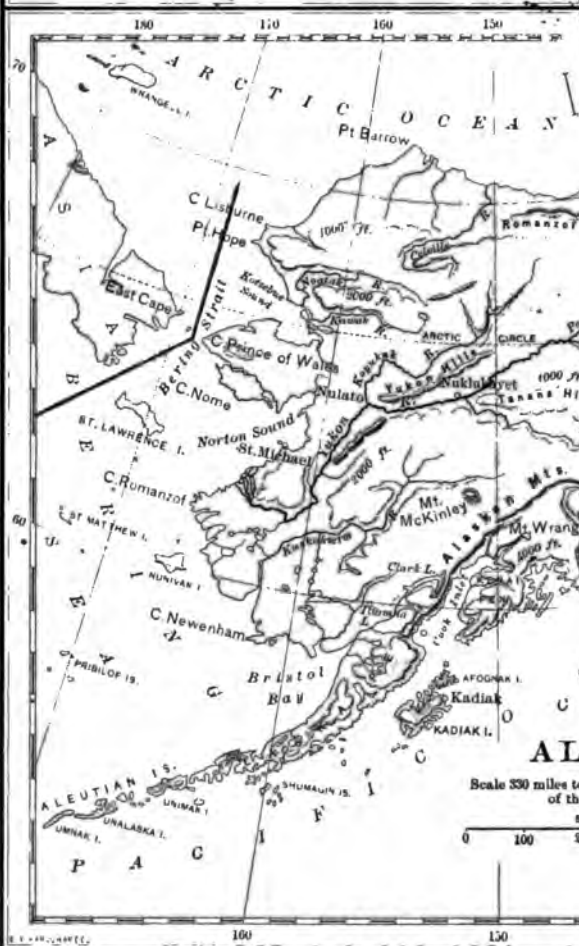
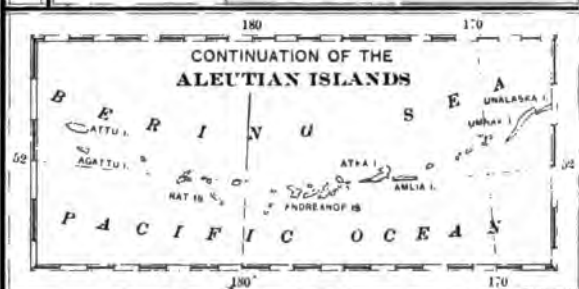
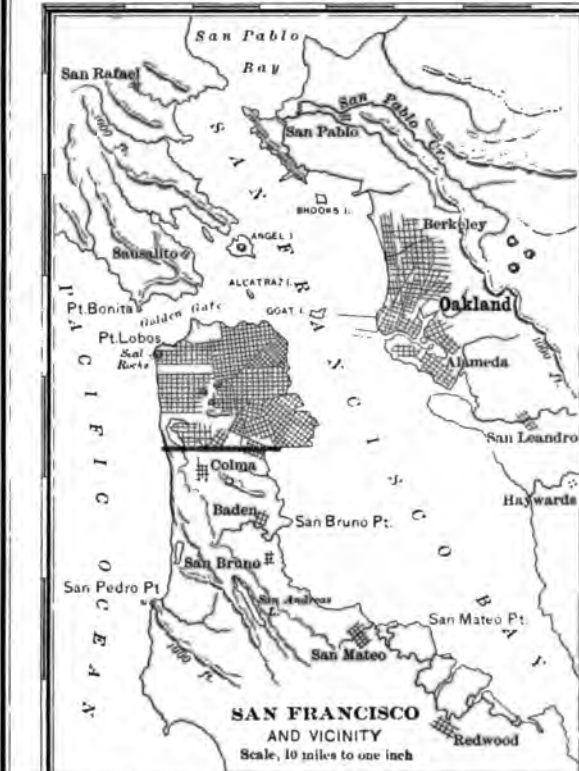
COLORADO. What divisions border Colorado? Trace the continental divide across the state. Name four mountain ranges. Locate four "parks" among the mountains; three mountain peaks. What great rivers have head waters within the state? Locate the capital; two other cities east of the mountains; one city among the mountains, near the source of the Arkansas River.



Bars of silver, Leadville, Colorado.

Colorado contains about as many people as all the rest of the Plateau Section. It produces more silver than any other region in the world, and it ranks first among the states of our country in the production of gold and of lead. The state has also valuable mines of iron ore and of coal. Considerable crops of wheat and garden produce are raised, chiefly east of the mountains, and herding is important in the "parks," especially in the south. Many invalids resort to Colorado because of its dry, pure air.

Denver is the receiving and distributing point for a wide mining and herding region. It is the chief railroad center of the state, and the largest city of the section, having grown very rapidly since the discovery of gold in Colorado just before the Civil War. *Pueblo* has easy access by



WASHINGTON. By what is Washington bordered? What parts of the state lie in the Columbia valley? What sound is in the northwest? By what strait is it joined to the Pacific? What part of the state is mountainous? Locate the capital; two other cities in the west; one in the east.

The western part of the state is well covered with cone-bearing forests, which are its chief wealth. The largest lumber mills in the world are along Puget Sound. The fertile farming lands in the Sound valley and east of the Cascade Mountains yield large crops of wheat, hops, and fruits. Coal is mined in the north more extensively than elsewhere in the sec-



Lumbering, Washington.

tion. The salmon fisheries of the Columbia add much to the wealth of the state.

Seattle is in the coal and lumber region. *Tacoma* is at the western end of a transcontinental railway. *Spokane* has a fine water power and many manufactories.

OREGON. By what is Oregon bordered? Name its three mountain ranges. How does eastern Oregon compare with eastern Washington in elevation, slope, and climate? What part of the state is quite dry? How does the map indicate this? Name the capital; one other city on the Willamette; one at the mouth of the Columbia.

In the fertile Sound valley great quantities of wheat, oats, hops, and fruit are raised, and much fine wheat for export is grown by the aid of irrigation in northeast Oregon. The wool clip is large, and many cattle are raised. Magnificent forests of "Oregon pine" cover much of the western half of the state, and lumbering is an important industry. Gold mining is

carried on chiefly in the mountains of the southwest and the northeast. The Columbia River salmon fisheries of Oregon are among the most valuable in the world.

Portland is the largest city in the Sound valley. The building of jetties at the mouth of the Columbia has made it possible for large steamships to ascend to the city, and its foreign commerce is extensive. *Salem* has large flour and woolen mills. *Astoria* is the center of the salmon-fishing and canning industry, and ships much lumber.



A fish-wheel, Columbia River.

CALIFORNIA. By what is California bordered

What cape on the Atlantic coast is in nearly the same latitude as the northern state boundary? What Atlantic coast city is in nearly the same latitude as the southern state boundary? (map, p. 56.) Compare the area of the state with that of New England. What mountain ranges are in the state? What two rivers drain the California valley? Into what do they flow? Locate the capital; the chief city; three other cities in the central part of the state; two in the south.

California is nearly three times as large as any state of the Union east of the Mississippi River, and is exceeded in size by Texas only. It is one of the first states in the Union in the production of wool, wheat, and fruit, greatly exceeding all others in the crops of grapes, plums, and apricots. Oranges and lemons are raised in abundance.

California produces about one fourth of the gold mined in the United States, and a large part of the world's yield of quicksilver.

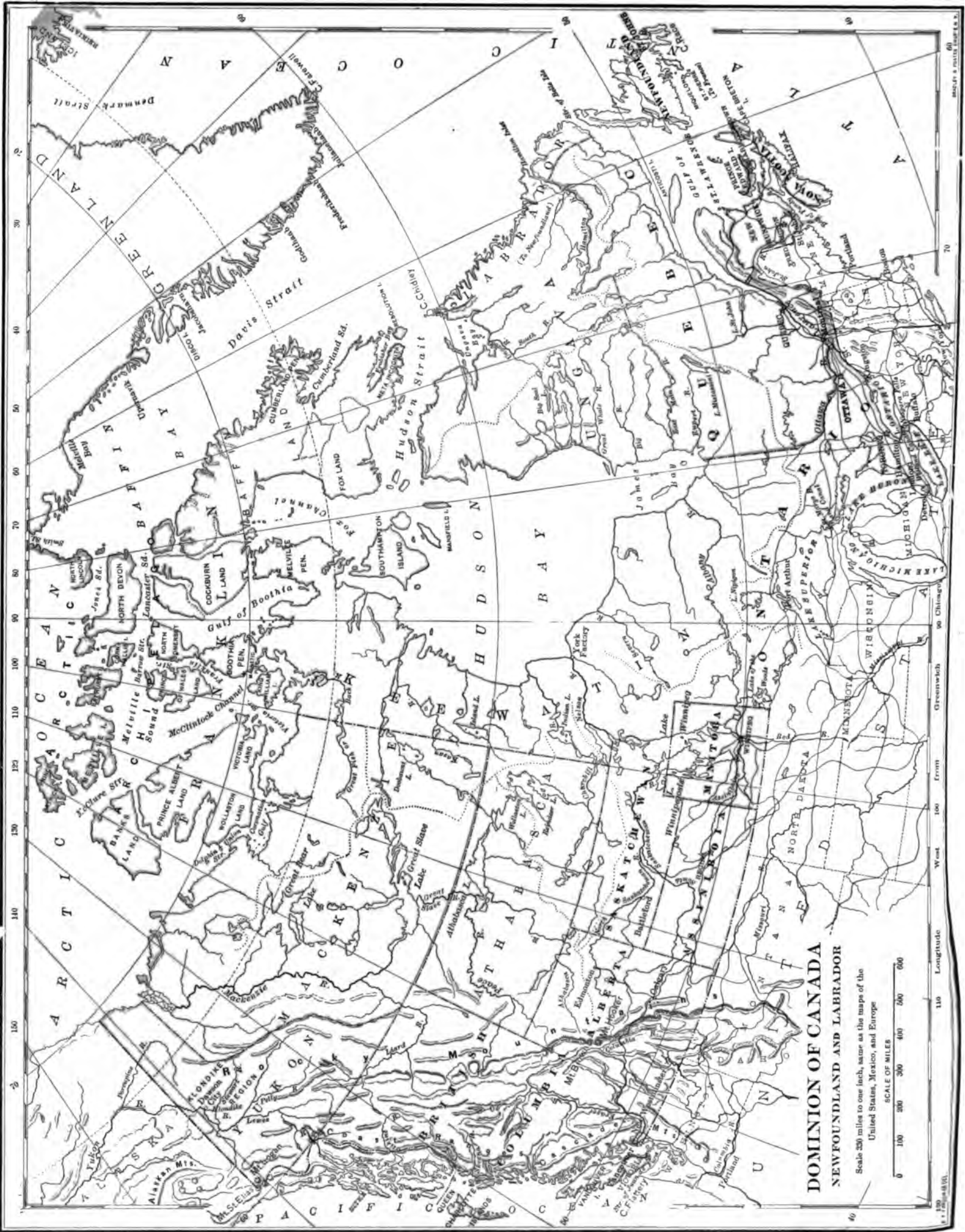
Valuable lumber is obtained from the redwood forests in the northwestern part of the state. On the west slopes of the Sierra Nevada are several small groves of a kind of redwood, which contain some of the most gigantic trees in the world.

The chief manufacturing industries are flour and lumber milling, the tanning of leather, wine making and fruit preserving, shipbuilding, and the refining of cane sugar brought from the islands of the Pacific.

San Francisco, one of the seven greatest cities of the Union, and the largest city on the Pacific slope of the American continent, lies on the peninsula between San Francisco Bay and the Pacific Ocean. It owes its growth chiefly to the fine, deep harbor afforded by the large and beautiful bay. The bay is nearly land-locked, being connected with the ocean only by a



Mt. Hood, Oregon.



**DOMINION OF CANADA
NEWFOUNDLAND AND LABRADOR**

Scale 250 miles to one inch, same as the maps of the
United States, Mexico, and Europe

SCALE OF MILES
0 100 200 300 400 500 600

110 Longitude

COUNTRIES NORTH OF THE UNITED STATES.

THE DOMINION OF CANADA.

What country borders the United States on the north? In what zones is Canada? Through how many degrees of latitude does it extend? Through how many degrees of longitude? How does it compare with the main body of the United States in extent of latitude and longitude? Do degrees of longitude in central Canada and central United States contain the same number of miles? Compare the two countries in area.

What great bay is in Canada? Compare it with the Gulf of Mexico in position, size, depth, and usefulness. What archipelago is north of Canada? What strait separates the eastern part of this archipelago from the mainland? What two peninsulas are on the north coast of Canada? What gulf is east of Canada? What four large islands are bordered by the waters of this gulf? What peninsula? What large islands are off the west coast of Canada?

From the physical map of North America locate the highlands of Canada. Compare the width of the western highland with that of the Rocky Mountain highland in the United States. Locate the principal mountain ranges. What plateau is in the east? What part of Canada is lowland? Trace the divide of the Hudson Bay slope (p. 92). Name the principal river basins of that slope; of the Arctic slope; of the Gulf of St. Lawrence slope. Name the chief basins of the Pacific slope. In which of the basins of Canada are there large lakes? In which are the largest lakes?

From the maps on p. 46 describe the climate and rainfall of eastern, central, and western Canada.

So much snow falls on the western highland of Canada that the higher parts of the mountain ranges abound in glaciers. Nearly all the large rivers which rise in this region flow from the melting ends of glaciers. Many of the snow-topped mountains have precipitous sides, and their lower slopes are covered with heavy evergreen forests, so that this region is noted for its scenery.

Which side of the Laurentian plateau is highest? The coast of Labrador is mainly rough and rugged, but it contains many good harbors. The greater part of the plateau is bleak and unfit for cultivation.

The northern coast of Canada is so cold that neither trees nor food plants can grow there. Farther south, a broad forest belt stretches entirely across the continent, though large parts of it have been injured by fire. In the southern part of this belt are valuable forests of pine

and other building timber. Wheat and the hardier plants of the temperate zone ripen in southern Canada, though the winters are long and cold. The basin of the Saskatchewan is the chief wheat-growing region, and the peninsula between Lake Huron and Lake Erie is a fruit and dairy region.

In the cold, uninhabited regions of the north, caribou and fur-bearing animals are abundant. The coast fisheries of southern Canada are among the most extensive in the world. Cod, herring, and mackerel are the chief catch in the eastern, and salmon in the western coast waters.

The mineral product is about equal in value to that of the fisheries. Gold, silver, and copper are mined in the western part, and coal in both east and west. Nickel also is a valuable mineral product.

Although Canada is about as large as the United States, the population is not so great as that of New York state. In what part of Canada is the population most dense? (map, p. 49.)

The first white settlers in the St. Lawrence basin were Frenchmen, but thirteen years before the United States was formed, Great Britain gained possession of Canada by war. British settlers and their descendants now form the greater part of the population, and their energy has made of Canada the most prosperous part of the Western Continent, after the United States. There are, however, many descendants of the old French settlers still living in Canada. Most of them live in the lower St. Lawrence valley, and many of them are in language, dress, and manners



Rocky Mountains, Canada.



Fur trading post in northern Canada.

much like the people of France a hundred years ago. They belong mainly to the Catholic Church, while the greater part of the people of English descent are Protestants. In the region farther west there are many "half-breeds" of mixed French and Indian descent.

In the northern part are a few thousand Eskimos and other Indians. In the winter the Eskimos build their huts of snow or of stones along the coast, but in summer they migrate inland to the regions where the caribou are abundant. The Indians are hunters and trappers. The game which they procure is valuable chiefly for the fur. All through this region the Hudson Bay Company has established trading posts, where most of the pelts are sold.

Although Canada remains a British possession, the French retain the two small islands of St. Pierre and Miquelon, south of Newfoundland, which they use as fishing stations. Point them out on the map.

The kingdom of Great Britain has permitted the people of Canada to form a government, for the management of



Wharves at Montreal.



Parliament building, Ottawa.

Canadian affairs, something like that of the United States. There are seven *provinces*, similar to our states, each with its local government, and a number of thinly settled *districts*, somewhat like our territories, which together have a single local government. The people of each province and of all the districts together elect representatives to a *Parliament*, like our Congress, which makes laws for the whole Dominion. But instead of an elected president, as in our country, Canada has a governor general appointed by the monarch of Great Britain.

Where is the province of *Prince Edward Island*? It is the smallest and most thickly settled province. What is the name of its capital?

Of what two natural divisions is the province of *Nova Scotia* formed? The fisheries of this province are more

valuable than those of any other. Most of the coal mined in eastern Canada comes from Nova Scotia. Name and locate the capital. It is the chief British naval station in North America.

From the province of *New Brunswick* lumber and cured fish are exported. Name and locate the capital. St. John is the largest city and the chief port.

By what waters are these three provinces bordered?

What province is north of New Brunswick? *Quebec* is settled mainly by people of French descent. In population and wealth it ranks

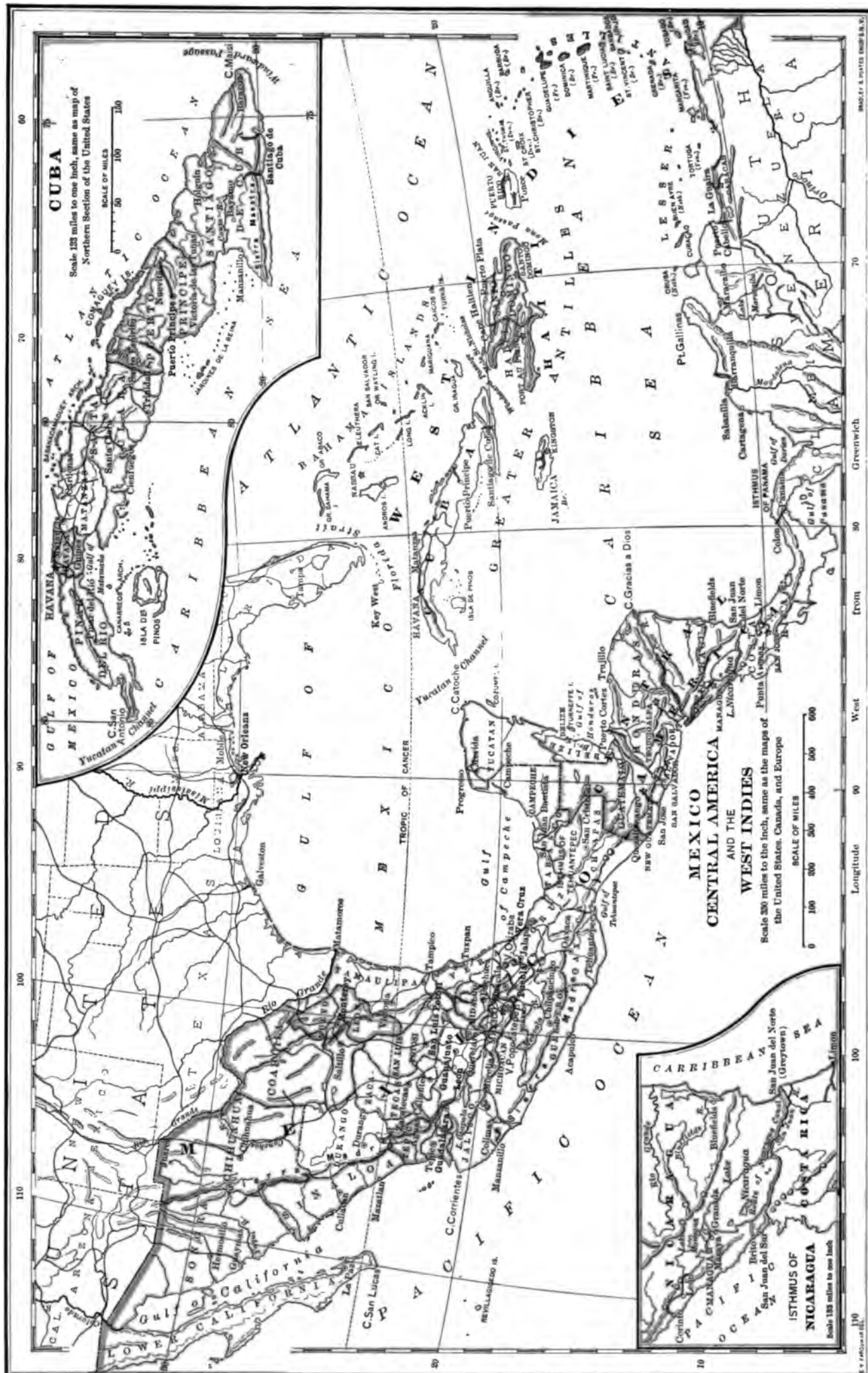
second among the provinces of Canada. The city of *Quebec* is the oldest city in Canada, and one of the oldest in North America. The upper city is situated on a high bluff overlooking the river, and is surrounded by fortifications; the business part of the city lies without the walls, along the river front. Where is *Montreal*? Ocean steamships ascend the river to its wharves. In winter, when the river and gulf are ice-locked, through what American city does the trade of *Montreal* pass? (p. 63.)

What province borders the Great Lakes? *Ontario* is the most prosperous and wealthy province of Canada, and contains nearly half the population. *Toronto* is the capital. Where is it? The capital of the whole Dominion is also in *Ontario*. What is its name?

In what great river basin is the province of *Manitoba*? What three districts lie mostly in the same basin? What is the chief crop of these districts and this province? What is the capital of *Manitoba*? It is the chief commercial center of the region.



The Citadel, Quebec.



CUBA

Scale 125 miles to one inch, same as map of Northern Section of the United States

SCALE OF MILES

0 50 100 150

MEXICO

CENTRAL AMERICA

AND THE WEST INDIES

Scale 250 miles to the inch, same as the maps of the United States, Canada, and Europe

SCALE OF MILES

0 100 200 300 400 500 600

Longitude

West

From Greenwich

110

100

90

80

70

60

50

40

30

20

10

0

10

20

30

40

50

60

70

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90

100

110

120

130

140

150

160

170

180

190

200

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But few people live in Greenland, and most of these are Eskimos. They are a cheerful but ignorant people, and live in low, filthy hovels made of loose stones, or sometimes of blocks of snow and ice. They live chiefly by fishing and hunting for sea animals, using the flesh for food, the fur for clothing, and the fat for fuel. On the southwest coast there are two or three small trading settlements of white men from Denmark.

ICELAND is about as large as the state of Indiana. It is mostly a rugged plateau containing, in the north, many volcanoes, several of which are active and cause frequent earthquakes. Most of the island is covered with the lava outflows from these volcanoes. Hot springs are numerous, and there are several fine geysers. Parts of the island are covered with ice fields, and the deep fiords of the northern coast are often packed with ice brought in by the Arctic currents. The



Eskimo boy and dog.

southern coast is much less broken, and is kept free from ice by the warm currents from the south.

The climate, though raw and moist, is moderated in the south by winds from the ocean, and grass and vegetables grow well, though it is too cold for grain, and there are but few trees. There are very few native land mammals, but many birds, and the coast waters abound in excellent fish.

Iceland was discovered and settled by Northmen from Europe long before Columbus discovered America, and their descendants still live there, chiefly in the southern part of the island. They are thrifty, intelligent, well-educated people, and are employed chiefly in raising sheep, cattle, and horses, and in fishing.

The people choose the members of the Congress, or *Althing*, which meets at the town of *Reikiavik* to make the laws; but the governor is appointed by the King of Denmark.

Supplemental Work.

Read "My Arctic Journal," by Josephine D. Peary, or "Farthest North," by Fridtjof Nansen. Read or recite "The Skeleton in Armor," by Longfellow.



Stone hut, Greenland.

COUNTRIES SOUTH OF THE UNITED STATES.

MEXICO.

What country borders the United States on the south? Through how many degrees of latitude and longitude does it extend? Compare it with the United States in size. In what zones is Mexico? What waters border it? What peninsulas does it contain? From the map on p. 44 locate the lowlands of Mexico. What part of the country is highland? Name and locate the chief mountain range. Are there many large rivers in Mexico? Name the two largest that drain portions of the country.

The surface of the Rocky Mountain highland in Mexico is quite similar to that of the great plateau region in the United States. It is bordered on the east and west by mountain ranges corresponding to the Rocky and the Cascade Mountains, but the western Mexican range is much higher and more continuous than the eastern. In the north the plateau is about three fourths of a mile high, but it rises gradually to twice that elevation in the south.

In this higher portion of the plateau are many great volcanic cones. One of them, Mount Orizaba, is about three and one half

miles high. Several of the volcanoes are active, and earthquakes are not uncommon throughout Mexico.

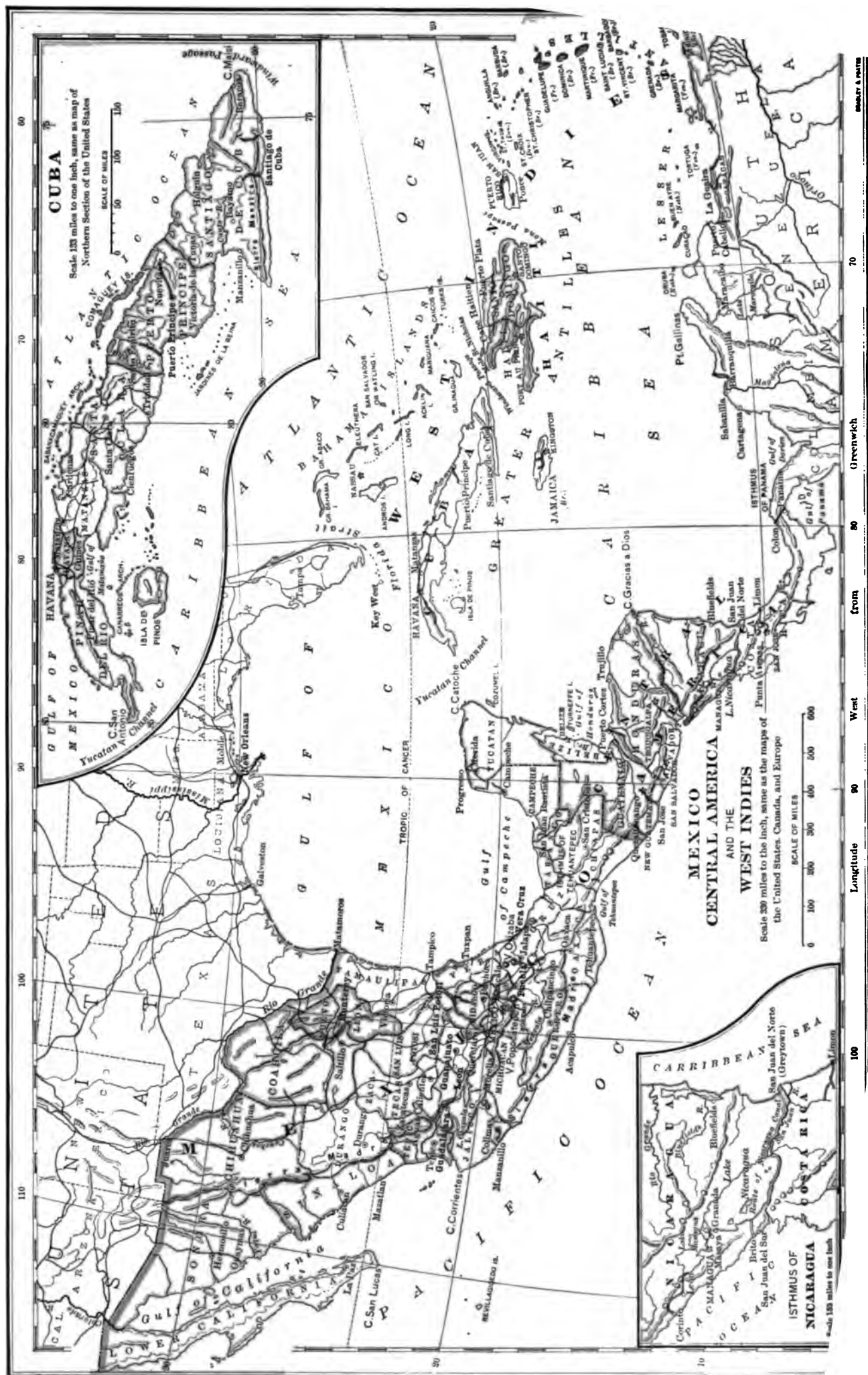
Owing to the tropical position of Mexico there is little difference between the temperature of summer and of winter; but because of the variation in elevation there is a great difference in the temperature of different regions. The lowlands are always hot; the plateau is always temperate; and the mountain region, more than 1½ miles high, is cool or cold, some of the higher peaks being always snow-clad. The seasons of Mexico are the wet and the

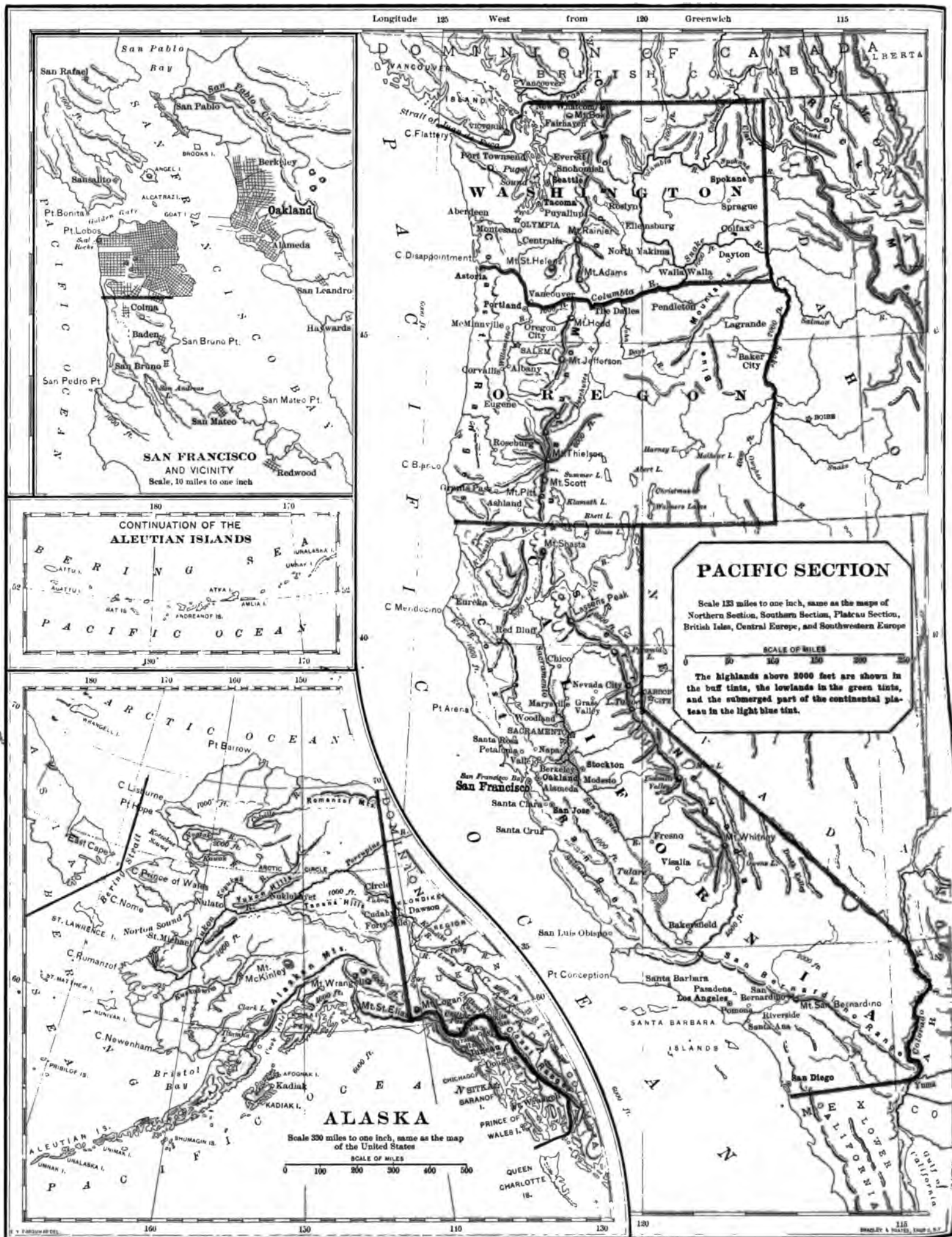
dry. Nearly all the rain falls during the summer months. Why? The northern part has very little rain at any time. Why?

Plants and animals of both the North and the South American regions are found in Mexico. Mention some of the animals (pp. 30, 31). In the lowlands mahogany, rosewood, logwood, rubber trees, medicinal plants, and vanilla grow in



Mexican cart.





THE PACIFIC SECTION.

What three states compose this section? What great mountain ranges traverse its central part? What part of the region receives ample rainfall? (p. 54.) What parts are quite dry? What have you learned of the seasons on the Pacific coast?

The Sierra Nevada and the Cascade Mountains are about as high as the Rocky Mountains, but they seem much higher and grander when viewed from the west, because they rise from lowland valleys instead of from a high plateau.

These great ranges contain some of the grandest mountain scenery in the country. The higher peaks of both ranges reach the limit of perpetual snow, and their upper valleys contain small glaciers. There are deep gorges and canyons in the western slope of the Sierra Nevada. One of these, the Yosemite valley, is especially noted for its magnificent scenery. The Cascade Mountains are noted for their high volcanic cones, chief among which are Mount Shasta and Mount Rainier.

West of the Sierra Nevada and Cascade Mountains there is comparatively little difference between summer and winter temperatures. East of the mountains, however, the climate is much drier, with hotter summers and colder winters. The rainfall west of the mountains occurs almost entirely during the winter months. Why?

In the north the rainfall is much heavier than in the south, and enough falls in the Columbia valley east of the Cascade Mountains for successful farming. In the south, however, irrigation is necessary in many localities. North of Point Conception, chilly and foggy weather is common near the coast, but south of that point the weather is warm and delightful throughout most of the year.

Agriculture is the principal industry in the valleys west of the great mountain ranges, and wheat, grapes, and other fruit are the most important crops. Much wheat is also raised east of the Cascade Mountains in the Columbia valley. Great quantities of barley and hops are also grown in this section. In the drier regions, and on the mountain slopes, cattle and sheep raising are important occupations. The wool clip of this section is very large.

What part of the section is wooded? (map, p. 59.) These forests are the heaviest in the United States. Those in the central part of

the section are composed chiefly of great redwoods, while farther north the fir, or "Oregon pine," is the most valuable tree. In these regions lumbering is a great industry.

Gold mining is extensively carried on in the west slope of the Sierra Nevada, which is one of the richest gold fields in the world. Much quicksilver is mined in the central part of this section, and considerable coal in the north.

Ages ago grains of gold were deposited with other detritus in the flood plains of many of the mountain streams. These gold-bearing gravel banks are dissolved by squirting powerful streams of water against them, and the gold is collected from the muddy water which flows away; the process being called

hydraulic mining. Much gold is also mined directly from veins in the solid rock.

How does the density of population in this section compare with that in the Plateau Section? Although the population, especially in the great valleys, is greater than on the Rocky Mountain highland, the section is still quite thinly settled. The whole section does not contain so many people as the city of New York. About half the people are foreigners, mostly German and Irish, but there are also many Chinese.

Notice on the railroad map (p. 60) that the section is traversed by railroads from north to south along the line of the Sound and California valleys. Most of the railroads which enter the section, however, are the great transcontinental lines which cross the Rocky Mountain highland from the Mississippi valley. In what

two parts of the section do these transcontinental lines converge?

The coast is closely bordered by the Coast Ranges, and has few bays and harbors. The ranges are broken in the north, however, by Puget Sound and the Columbia River, and in the central part by the Bay of San Francisco. These indentations afford safe harborage to the largest vessels, and from them almost all the foreign commerce of our Pacific coast is carried on. Why, then, do the railroads converge where they do?



Hydraulic gold mining, California.



Yosemite Falls.



Gathering grapes, California.

WASHINGTON. By what is Washington bordered? What parts of the state lie in the Columbia valley? What sound is in the northwest? By what strait is it joined to the Pacific? What part of the state is mountainous? Locate the capital; two other cities in the west; one in the east.

The western part of the state is well covered with cone-bearing forests, which are its chief wealth. The largest lumber mills in the world are along Puget Sound. The fertile farming lands in the Sound valley and east of the Cascade Mountains yield large crops of wheat, hops, and fruits. Coal is mined in the north more extensively than elsewhere in the sec-



Lumbering, Washington.

tion. The salmon fisheries of the Columbia add much to the wealth of the state.

Seattle is in the coal and lumber region. *Tacoma* is at the western end of a transcontinental railway. *Spokane* has a fine water power and many manufactories.

OREGON. By what is Oregon bordered? Name its three mountain ranges. How does eastern Oregon compare with eastern Washington in elevation, slope, and climate? What part of the state is quite dry? How does the map indicate this? Name the capital; one other city on the Willamette; one at the mouth of the Columbia.

In the fertile Sound valley great quantities of wheat, oats, hops, and fruit are raised, and much fine wheat for export is grown by the aid of irrigation in northeast Oregon. The wool clip is large, and many cattle are raised. Magnificent forests of "Oregon pine" cover much of the western half of the state, and lumbering is an important industry. Gold mining is

carried on chiefly in the mountains of the southwest and the northeast. The Columbia River salmon fisheries of Oregon are among the most valuable in the world.



A fish-wheel, Columbia River.

Portland is the largest city in the Sound valley. The building of jetties at the mouth of the Columbia has made it possible for large steamships to ascend to the city, and its foreign commerce is extensive. *Salem* has large flour and woolen mills. *Astoria* is the center of the salmon-fishing and canning industry, and ships much lumber.

CALIFORNIA. By what is California bordered?

What cape on the Atlantic coast is in nearly the same latitude as the northern state boundary? What Atlantic coast city is in nearly the same latitude as the southern state boundary? (map, p. 56.) Compare the area of the state with that of New England. What mountain ranges are in the state? What two rivers drain the California valley? Into what do they flow? Locate the capital; the chief city; three other cities in the central part of the state; two in the south.

California is nearly three times as large as any state of the Union east of the Mississippi River, and is exceeded in size by Texas only. It is one of the first states in the Union in the production of wool, wheat, and fruit, greatly exceeding all others in the crops of grapes, plums, and apricots. Oranges and lemons are raised in abundance.

California produces about one fourth of the gold mined in the United States, and a large part of the world's yield of quicksilver.

Valuable lumber is obtained from the redwood forests in the northwestern part of the state. On the west slopes of the Sierra Nevada are several small groves of a kind of redwood, which contain some of the most gigantic trees in the world.

The chief manufacturing industries are flour and lumber milling, the tanning of leather, wine making and fruit preserving, shipbuilding, and the refining of cane sugar brought from the islands of the Pacific.

San Francisco, one of the seven greatest cities of the Union, and the largest city on the Pacific slope of the American continent, lies on the peninsula between San Francisco Bay and the Pacific Ocean. It owes its growth chiefly to the fine, deep harbor afforded by the large and beautiful bay. The bay is nearly land-locked, being connected with the ocean only by a



Mt. Hood, Oregon.

comparatively narrow strait, called the Golden Gate, just north of the city.

The city was founded by Spanish Franciscan monks from Mexico, who established here the Mission of San Francisco in the same year that the English colonists on the Atlantic coast declared their independence of Great Britain. A small Spanish settlement sprang up about the mission, and for nearly seventy-five years continued under the control of Mexico. It then came into the possession of the United States. The discovery of gold in California at about the same time brought thousands of people to San Francisco, and it immediately became the most important commercial center on the Pacific coast, a position it has since been able to retain because of the excellence of its harbor and the ease with which it is reached from nearly all parts of the Pacific coast region.

An extensive ocean commerce is carried on with Japan, China, Australia, and the Pacific Islands, and by way of the Isthmus of Panama, or around Cape Horn, with Europe and the east coast of the United States. The heaviest commerce, however, is overland by the transcontinental railroads. More than half of the manufacturing of the state is centered in this city, the chief industries being sugar refining and the manufacture of clothing and mining machinery.

Los Angeles, the commercial center of southern California, is in the orange-growing region. *Oakland*, on the opposite side of the bay from San Francisco, is a great suburb and railroad terminus of that city, as Jersey City is of New York. *Sacramento* is in a fertile agricultural region. The city is protected from floods by levees. *San Jose* and *Stockton* are important trade centers. *San Diego* has a good harbor.

ALASKA. Where is Alaska? What country is east of it? What waters are north, west, and south? By what is it separated from Asia? How wide is this strait? What part is most mountainous? What great river traverses the country? To what nation does Alaska belong?

Alaska is almost as large as Washington, Oregon, California, and Texas taken together, and yet it does not con-



Muir glacier, Alaska.

tain so many people as the city of Oakland. On the map of North America (p. 44) compare the latitude of Alaska with that of Greenland. Can you give one reason why so few people live in Alaska?

The southern coast of Alaska is very rough and mountainous. Some of the peaks of these mountain ranges are over three miles high; they are the highest in North America. These mountains prevent the warm, moist winds of the Pacific from reaching the interior, which is conse-

quently very cold during the greater part of the year. Part of the interior is covered with open forests, but much of it is a bleak tundra. The southern slopes of the mountains are much warmer, receive abundant rains, and are covered with forests. The summits of the mountains are always snow-clad. Great glaciers creep down most of the larger valleys, many of them extending to the sea.

Nearly all of the people live near the southern coast. A few of the inhabitants are white men, but most of the



A street in Sitka, Alaska.

people are Eskimos and Indians. Some hardy vegetables grow in this region, but it is too damp for grain.

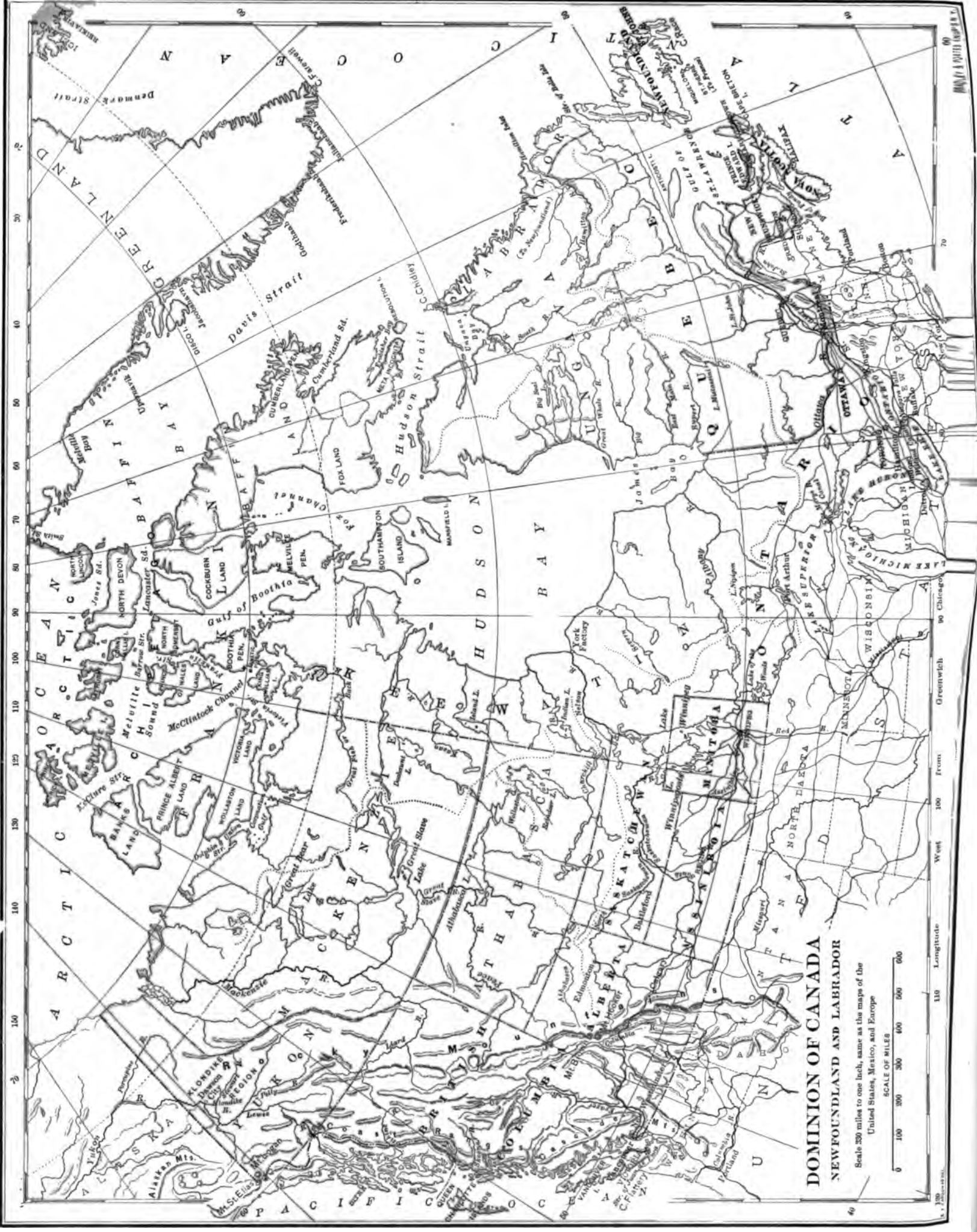
The chief occupations are hunting fur-bearing animals, fishing for cod and salmon, and gold mining.

Where are the Pribilof Islands? Thousands of fur seals go to these islands every summer and establish rookeries, or nurseries, where their young are born and taught to swim. Most of our sealskin garments are made from the skins of seals killed on or near these islands. The sea otter, the marten or sable, the black bear, and the silver fox are also killed in Alaska for their fur. Gold is found in many places in Alaska. There are rich fields near Cape Nome and on the Koyukuk River. A rich gold field is on the Klondike, a branch of the Yukon River in Canada, just across the Alaskan boundary, and many white miners have gone through Alaska to found Dawson and other mining towns in that region. But mining in that latitude is very costly and dangerous because of the rigor of the climate and the scarcity of food.

Alaska has not yet a regular territorial government, but is ruled by a governor and several commissioners appointed by the Federal government at Washington. The chief settlements are *Juneau*, a mining town, and *Sitka*, the residence of the governor, on Baranof Island.

Hawaii, Samoa, p. 153. Puerto Rico, p. 100. Philippines, p. 142.

Supplemental Work. Read "The Young Nimrods in North America," by T. W. Knox; "Three Vassar Girls at Home," by Lizzie W. Champney; "The Pacific Coast Scenic Tour," by Henry T. Finck, or "The Valley of the Yosemite," in Sheldon's Fifth Reader. Read or recite one selection on these states from Longfellow's "Poems of Places," Vol. 29. Describe one city or scene in this section as fully as San Francisco is described. Write next day a reproduction of the description given by one of your schoolmates. Read "Our Western Archipelago," by Henry M. Field; "A Woman's Trip to Alaska," by Mrs. S. M. Collis.



COUNTRIES NORTH OF THE UNITED STATES.

THE DOMINION OF CANADA.

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Which side of the Laurentian plateau is highest? The coast of Labrador is mainly rough and rugged, but it contains many good harbors. The greater part of the plateau is bleak and unfit for cultivation.

The northern coast of Canada is so cold that neither trees nor food plants can grow there. Farther south, a broad forest belt stretches entirely across the continent, though large parts of it have been injured by fire. In the southern part of this belt are valuable forests of pine

and other building timber. Wheat and the hardier plants of the temperate zone ripen in southern Canada, though the winters are long and cold. The basin of the Saskatchewan is the chief wheat-growing region, and the peninsula between Lake Huron and Lake Erie is a fruit and dairy region.

In the cold, uninhabited regions of the north, caribou and fur-bearing animals are abundant. The coast fisheries of southern Canada are among the most extensive in the world. Cod, herring, and mackerel are the chief catch in the eastern, and salmon in the western coast waters.

The mineral product is about equal in value to that of the fisheries. Gold, silver, and copper are mined in the western part, and coal in both east and west. Nickel also is a valuable mineral product.

Although Canada is about as large as the United States, the population is not so great as that of New York state. In what part of Canada is the population most dense? (map, p. 49.)

The first white settlers in the St. Lawrence basin were Frenchmen, but thirteen years before the United States was formed, Great Britain gained possession of Canada by war. British settlers and their descendants now form the greater part of the population, and their energy has made of Canada the most prosperous part of the Western Continent, after the United States. There are, however, many descendants of the old French settlers still living in Canada. Most of them live in the lower St. Lawrence valley, and many of them are in language, dress, and manners



Rocky Mountains, Canada.



Fur trading post in northern Canada.

much like the people of France a hundred years ago. They belong mainly to the Catholic Church, while the greater part of the people of English descent are Protestants. In the region farther west there are many "half-breeds" of mixed French and Indian descent.

In the northern part are a few thousand Eskimos and other Indians. In the winter the Eskimos build their huts of snow or of stones along the coast, but in summer they migrate inland to the regions where the caribou are abundant. The Indians are hunters and trappers. The game which they procure is valuable chiefly for the fur. All through this region the Hudson Bay Company has established trading posts, where most of the pelts are sold.

Although Canada remains a British possession, the French retain the two small islands of St. Pierre and Miquelon, south of Newfoundland, which they use as fishing stations. Point them out on the map.

The kingdom of Great Britain has permitted the people of Canada to form a government, for the management of



Parliament building, Ottawa.

Canadian affairs, something like that of the United States. There are seven *provinces*, similar to our states, each with its local government, and a number of thinly settled *districts*, somewhat like our territories, which together have a single local government. The people of each province and of all the districts together elect representatives to a *Parliament*, like our Congress, which makes laws for the whole Dominion. But instead of an elected president, as in our country, Canada has a governor general appointed by the monarch of Great Britain.

Where is the province of *Prince Edward Island*? It is the smallest and most thickly settled province. What is the name of its capital?

Of what two natural divisions is the province of *Nova Scotia* formed? The fisheries of this province are more



Wharves at Montreal.

valuable than those of any other. Most of the coal mined in eastern Canada comes from Nova Scotia. Name and locate the capital. It is the chief British naval station in North America.

From the province of *New Brunswick* lumber and cured fish are exported. Name and locate the capital. St. John is the largest city and the chief port.

By what waters are the three provinces bordered?

What province is north of New Brunswick? *Quebec* is settled mainly by people of French descent. In population and wealth it ranks

second among the provinces of Canada. The city of *Quebec* is the oldest city in Canada, and one of the oldest in North America. The upper city is situated on a high bluff overlooking the river, and is surrounded by fortifications; the business part of the city lies without the walls, along the river front. Where is Montreal? Ocean steamships ascend the river to its wharves. In winter, when the river and gulf are ice-locked, through what American city does the trade of Montreal pass? (p. 63.)

What province borders the Great Lakes? *Ontario* is the most prosperous and wealthy province of Canada, and contains nearly half the population. Toronto is the capital. Where is it? The capital of the whole Dominion is also in Ontario. What is its name?

In what great river basin is the province of *Manitoba*? What three districts lie mostly in the same basin? What is the chief crop of these districts and this province? What is the capital of Manitoba? It is the chief commercial center of the region.



The Citadel, Quebec.

What province borders on the Pacific? This is the largest of the provinces. Gold and coal mining are the chief employments. Name and locate the capital. Vancouver, the largest town on the mainland, is an important commercial center.

The chief wealth of the districts in northern Canada is derived from the fur trade. The district of Yukon, however, is more important for the rich gold mines in the Klondike region. What city is the center of this region?

Most of the trade of Canada is with the United States and Great Britain. Her exports are largely to Great Britain; her imports largely from the United States. From Montreal, from St. John, and from Halifax steamship lines run to European ports, and from Vancouver there are steamship lines to Japan and Australia. From Montreal to Vancouver there is a great transcontinental railroad, connecting by branch roads with the chief northern cities of the United States. This road is shorter than any of the northern transcontinental roads in the United States, and crosses the western highlands by lower passes. Therefore, besides the foreign trade of the Dominion itself, considerable traffic between Europe and Asia crosses Canada.

The island of *Newfoundland*, together with the Labrador coast, forms a British colony by itself, and is not a part of the Dominion of Canada. The interior of the island is a wilderness. The chief occupation is fishing, and a large part of the population of the island live along the coast of the mainland during the fishing season. What is the capital of Newfoundland?

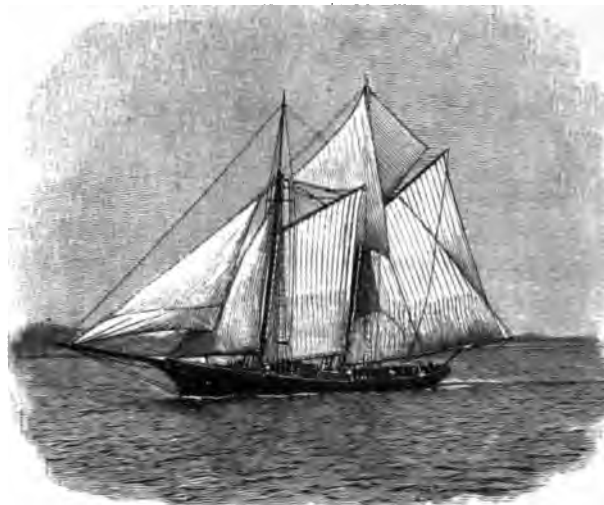
Supplemental Work. Read "The Story of Canada," by J. G. Bourinot; "Zigzag Journeys in Acadia and New France," by Hezekiah Butterworth; "Great-grandmother's Girls in New France," by Lizzie W. Champney; chapters 40 and 41 of "Carpenter's Geographical Reader, North America." Read or recite one selection about Canada from Longfellow's "Poems of Places," Vol. 30.



Montmorency Falls (near Quebec) in winter.

DANISH AMERICA.

What two islands rise from the continental plateau between Europe and America? (maps, pp. 8 and 16.) In what hemisphere is Greenland; most of Iceland? Are these islands nearer to America or to Europe? Which of them is the larger? How does Greenland seem to rank among the islands of the world in size?



A Newfoundland fishing schooner.

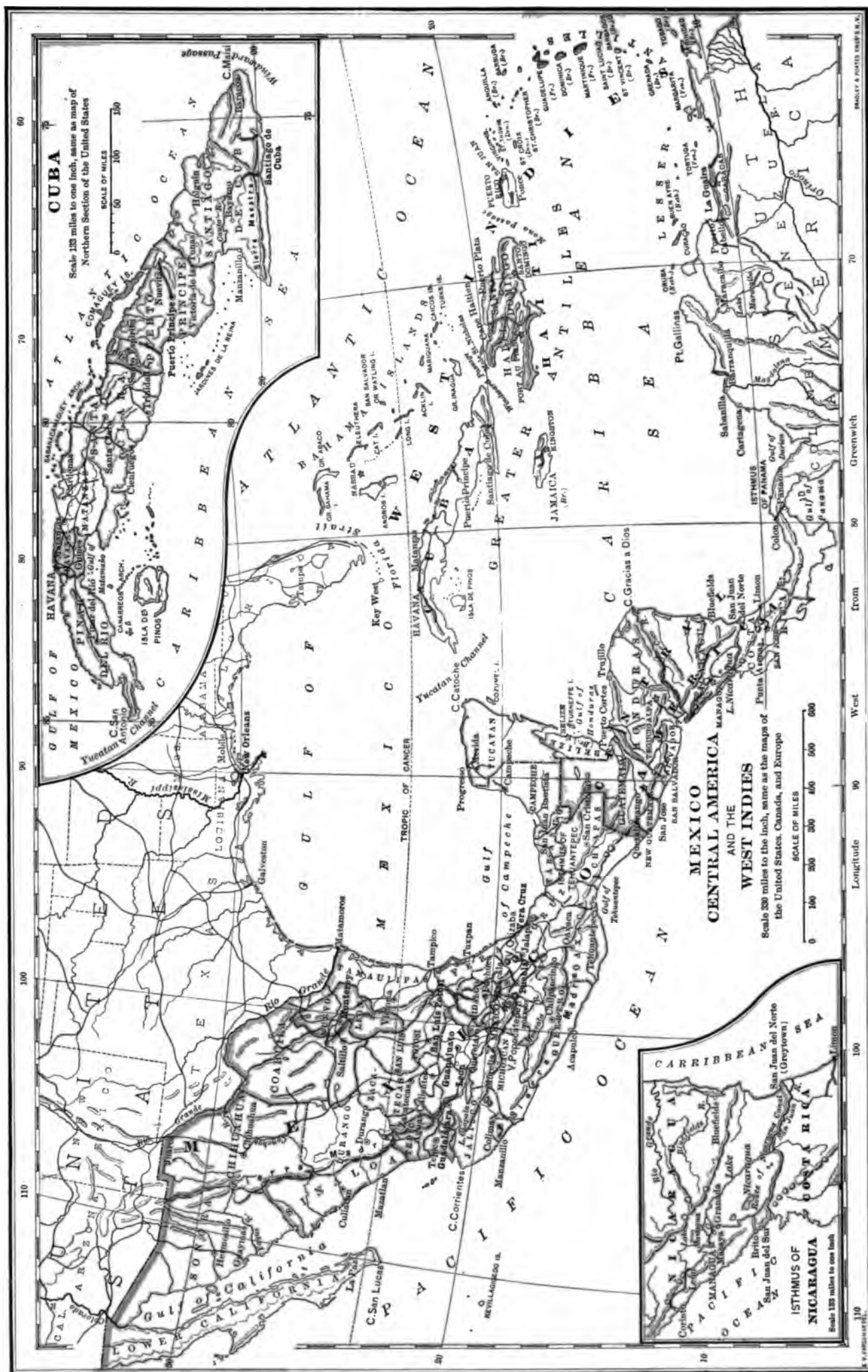
GREENLAND. Nearly the whole of Greenland is covered hundreds, possibly thousands, of feet deep by a continental glacier. It is only near the coast that the surface of the land is not covered with ice. It is thought that Greenland may not be a single island, but may consist of several islands connected by the ice cap. What sort of

a coast has the southern half of Greenland? Judging from the coast line, do you think the part of the continental plateau occupied by Greenland has recently sunk or risen? Some people believe that it is the great weight of the ice sheet that has caused Greenland to sink! In places the ice sheet extends into the sea, forming long ice cliffs. Icebergs broken from these cliffs render the navigation of the Atlantic dangerous at certain seasons as far south as the neighborhood of Newfoundland. In southern Greenland the ice sheet reaches the sea only at the heads of the numerous long, narrow fiords, between which a narrow strip of high, rocky coast is not ice-covered.

On this coast region grows a scanty Arctic vegetation, chiefly mosses and lichens, with here and there patches of grass, and, during the short summer, some flowering plants. There are also a few stunted trees, but they rarely grow higher than a man's head. The principal wild animals of the land are the musk ox, the reindeer, the arctic fox, and the polar bear. The coast waters are frequented by seals, walruses, whales, and fish, besides millions of eider ducks, and other aquatic birds.



Traveling on the ice cap in Greenland.





Drying coffee, Mexico.

the dense forests, and rice, sugar cane, tobacco, and tropical fruits are cultivated, as well as the cassava, from the root of which the natives make farina meal for their bread; and Sisal hemp, or henequen, of which cordage and hammocks are made. On the mountain slopes are more open forests of oak, pine, and other trees of the temperate zones; and on the lower, warmer slopes coffee is cultivated. On the plateaus grain and beans are the chief crops. Mexico exports considerable coffee, Sisal hemp, and cabinet and dye woods.

A characteristic Mexican plant is the maguey, or "century plant," from the sweet sap of which the natives make a kind of cider called *pulque*, which is their favorite drink. It is a species of this plant that yields the Sisal hemp.

In the drier portions of the plateau the raising of cattle, horses, and sheep is an important industry, and many cattle and hides are exported.

The mines of Mexico are its chief wealth. What minerals are found in the western highland of the United States? Mexico is one of the great silver-producing countries of the world, and this metal and its ore form the chief exports. Smaller quantities of gold, lead, and copper are also exported, as well as the beautiful stone called onyx, which is used for interior decoration.

Long before America was colonized by white men, the Indians of central Mexico, called Aztecs, had advanced nearly to the stage of civilization. They had formed a confederacy, and lived in pueblos built of stone, cultivated corn by the aid of irrigation, wore ornaments of gold, and knew something of working other metals.

Not long after the discovery of America a Spaniard named Cortez landed in Mexico, sunk his ships so that his soldiers might not return, and conquered Mexico for Spain. After about three hundred years of

Spanish rule the people rebelled and made their country independent. Since then Mexico has had a government modeled after that of the United States. The republic consists of twenty-seven states, two territories, and a federal district, like the District of Columbia. About one fifth of the people are white, mostly descendants of Spanish settlers; nearly one half are of mixed Spanish and Indian blood; and the rest are pure Indians. Most of the land is owned by the white people. Many of the Indians are laborers in the mines, or on the stock "ranches," or farmsteads. Nearly all Mexicans are Catholics.

The manufactures of Mexico are mainly cotton cloth, paper, and earthenware for home use; but the Indians make blankets and ornamental feather and leather work by hand.

The foreign commerce is chiefly with the United States, both by sea and by the several lines of railroad which connect the plateau region with the railroad system of the United States.

The city of *Mexico* is located in the federal district. It is the capital and largest city of the republic, and is built in a great basin-shaped depression of the plateau.



Silver smeltery, Mexico.

which contains several large lakes. The sewage of the city and the high-water overflow of the lakes are conveyed out of the basin by a drainage canal forty miles long, which for six miles of its length occupies a tunnel through the surrounding mountains. Most of the

buildings are low, and the dwellings are built around courtyards ornamented with flower gardens and paved with stone. Railroad connect the city with the railroad system of the United States.

Where is *Puebla*? Here are produced the most important manufactures of Mexico, among them the famous Mexican blankets. Nearly all the Mexican onyx is quarried near Puebla. What is the chief Atlantic seaport of Mexico? It is connected by railroad with the city of Mexico, and about two thirds of the foreign trade goes



Market place, city of Mexico.

half of this being in the single island of Cuba, which is nearly as large as the state of New York or Pennsylvania.

The larger islands are forest-covered. The

vegetation varies, as in Mexico and Central America, with the altitude. The most valuable product of the islands is sugar cane. About one fourth of all the cane sugar used in the world comes from the West Indies, and by far the greater part of it from Cuba, though it is the most important export of nearly every one of the islands. To-

bacco, known as Havana leaf, is another crop for which Cuba is specially noted. What cities of the United States manufacture much Cuban tobacco? (p. 81.) Other important exports of the islands are coffee, cacao beans, fresh fruit (bananas, pineapples, limes, oranges, and cocoanuts), and cabinet and dye woods. Excellent iron ore is also exported to the United States from southeastern Cuba, and asphalt from Trinidad. Find this island. Coarse sponges are obtained from the sponge fisheries of the Bahamas, and on some of these islands much salt is obtained by evaporating sea water.

About how many people live in the West Indies? (p. 157.) Which state of our country contains about the same population? The Bahamas, which are scarcely more than coral reefs, are very thinly peopled; in Cuba the population is moderately dense; the rest of the islands are densely peopled. Which islands of the West Indies formerly belonged to Spain? (p. 49.) By far the greater part of the white population of the whole chain live in these two islands, where there are nearly twice as many whites as negroes. In almost all the other islands the negroes are much more numerous than the whites, and in Haiti nearly all the people are of the black race. In several of the islands owned



Sorting sponges in the Bahamas.

by Great Britain laborers have been brought from China and southern Asia to work on the plantations.

Cuba and Puerto Rico embrace about half the area of the West Indies. The government of these islands is controlled by the United States. The former Spanish government was so unfavorable to the colonists that they were frequently at war with the mother country, and the great natural wealth of the islands was but partly developed. Name the capital of each island. Havana is the largest city in the West Indies, and the greatest exporting point for sugar and tobacco. Mar-



Plowing in Cuba.



Sugar mill, Cuba.

cigars and cigarettes are made in that city for export. Santiago de Cuba is also a large city, and exports iron ore and copper.

The island of Haiti includes nearly one third of the area of the chain, and consists of two independent negro republics. Name them. Years ago *Haiti* was a French colony, and a form of the French language is used by the negro inhabitants. *Santo Domingo*, however, was a Spanish colony, and the Spanish language still prevails in that part of the island.

Nearly one sixth of the area of the chain belongs to Great Britain. Find *Jamaica*, *Trinidad*, and the little island of *Barbados*. They are by far the most important of the British West Indies. Barbados is the most densely settled island of the whole chain, and exports much sugar.

Find *Guadelupe* and *Martinique*. They are French possessions, and are the largest islands of the Lesser Antilles, after Trinidad.

Several small islands of the Lesser Antilles belong to the European kingdoms of Denmark and the Netherlands, and several near the northern coast of South America are part of the republic of Venezuela.

Supplemental Work. Read "The Story of Mexico," by Susan Hale; "The Boy Travellers in Mexico," by Thos. W. Knox; "A Winter in Central America and Mexico," by Helen J. Sanborn; "At Last: a Christmas in the West Indies," by C. Kingsley; chapters 42, 43, and 44 of "Carpenter's Geographical Reader, North America." Read or recite a selection from Longfellow's "Poems of Places," Vol. 30, about southern North America.

CORRELATIONS AND COMPARISONS.

Size. Through how many degrees of latitude does North America extend? Through how many degrees of longitude? When it is mid-night in the Pribilof Islands, what time is it in eastern Greenland; in Newfoundland?

Coast. Name the chief seas and bays of the grand division; the chief peninsulas; the chief islands. Compare Greenland and Cuba in size; in surface; in climate. Compare Newfoundland and Vancouver. Compare Florida and Lower California in position; in latitude; in climate; in formation. Compare Hudson Bay and the Gulf of Mexico. Compare the Chesapeake and San Francisco bays. Where are there low, sandy coasts in North America? Name a cape on such a coast, and explain the formation of bars and sandy hooks.

Surface. Name the chief mountain ranges of eastern and western North America, giving the direction, the general height, the formation, and the comparative age of each system. Name some mountains with jagged tops; some with smooth and level tops. Name and describe the chief plateaus of North America. Name and describe the lowlands. Where are there valleys between mountain ranges; gaps across mountain ranges?

Drainage. Name some of the most noted springs of North America, telling about their appearance, temperature, and use. How are these classes of springs formed? Name some noted caves of North America. How are caves often formed? Name the chief lakes. How are lakes formed? Where are streams generally rapid? Why? Where are streams sluggish? Why? Why are some streams rapid in some parts and sluggish in other parts? Name some rivers which have built deltas, and explain delta formation. Name some which flow into estuaries, and give the history of estuary formation. Name some rivers whose mouths are obstructed by bars. How are such obstructions formed? Name some rivers which have cut canyons, and explain the formation of canyons. Name some which meander through flood plains, and describe flood plain formation. Name some rivers which are obstructed by falls. How are some falls formed? Where are there rivers which decrease as they advance? Why? Name some rivers useful to commerce; some which have no commercial usefulness. Name some high divides; some low divides.

Soil. Name the unproductive regions of North America. Which are so because the soil is too cold; too dry; too swampy? Where has the presence of glaciers made the soil more fertile? How? Less fertile? How? Where are there alluvial plains; sandy plains; old lake beds; soil incrustated with salt? Why? What lands are artificially irrigated?

Rock Formations. Explain the formation of the Tidewater region of eastern North America; of the Piedmont region. In what region are there mountain folds? In what region are there tilted strata? In what region are there many veins containing mineral deposits? Describe the formation of such a vein. In what western region are there great outflows of lava? What is a lava bed? Where are there volcanoes in North America? Describe volcano formation. What proofs of former glacial action are found in North America? What proofs are found of the power of wind in influencing land forms? Where are there coal deposits? Describe the formation of coal; of peat. Which of the West Indies are coral islands? How are such islands formed? How may coral polyps aid in the growth of the mainland? Where are there some islands of volcanic formation near North America?

Climate. Locate the heat belts of North America in summer; in winter. Describe the temperature in five climatic belts or regions. Where are the greatest differences of climate owing to latitude? How long does freezing weather last in several regions? Describe the circulation of air over North America; the distribution of moisture. Show by examples how climate may be affected by elevations of land; by distribution of land and water; how climate may affect products and occupations. Describe the progress of a cyclone across North America: its path, its direction of rotation, and the weather produced by its different parts. Where are there snow-capped mountains; mountain glaciers; continental glaciers?

Life. What are the three life regions of North America? Which is the largest? Give reasons for the existence of these regions. How have the plants and animals of these regions adapted themselves to their surroundings? Where are there few life forms? Why? Where are there few large wild animals? Why? Give some uses to which the native plants and animals of North America are put.

People. In what parts of North America do people of the black race chiefly live? What part of the population do they form? In what countries are they chiefly found? Tell what you know of their history. What types of the yellow race are found in North America? In what part is each type found? Which of them was found here by the first white discoverers? What two peoples are included in this type? How do the Eskimos live? To what stage of progress have they attained? Where are they found? Where do the Indians chiefly live? What stages of progress have they reached? Where were they most advanced when America was discovered? Where have they most freely mingled with the whites? How numerous is this mixed race? Where have the Indians remained largely separate from the whites? Tell where and how some of the tribes live. What people of the white race chiefly inhabit North America? What nations early settled there? Why? From what nations do immigrants now come? Why? What parts of North America are most densely populated; least densely? Why? Try to explain the existence of the detached regions of moderately dense population. Has North America its proportionate share of the world's population? What nations occupy the grand division? Tell what you know of the history of these nations. What is their prevailing form of government? What other forms of government do you know? Describe each. What parts of North America belong to European nations? Describe the government of one of these. Name the republics of North America. Describe the government of the chief of these. What religion prevails in North America? What are the other chief religions of the world? What languages are spoken in North America? In what parts is each spoken? In what parts of the grand division is education most general? Name some important educational institutions.

Industries. How does the United States rank in each of the seven great industries? What are the chief industries of British America; of Danish America; of Mexico and Central America; of the West Indies?

Locate the chief agricultural regions of North America; describe the soil of each. How does agriculture depend upon climate? What is irrigation? Where is it practiced? Define fertilizers; rotation of crops. Tell where each of the following is grown, and what are the advantages of the regions where it thrives: wheat, corn, rice, hay, oranges, sugar cane, cacao, tobacco, cotton. Which of these are foods?

In what regions of North America are these animals raised: cattle; hogs; sheep; horses? Give the chief uses of each, and tell where they are best raised. Where are there fur-bearing animals? In what waters are obtained fish; coral; sponges?

Where are there dense forests; open forests; oak, cottonwood, pine, cedar, cypress, mahogany, redwood?

What regions yield anthracite coal, bituminous coal; petroleum, natural gas; iron, copper, gold, silver; marble? How are some of these formed? How are some obtained? How are some used?

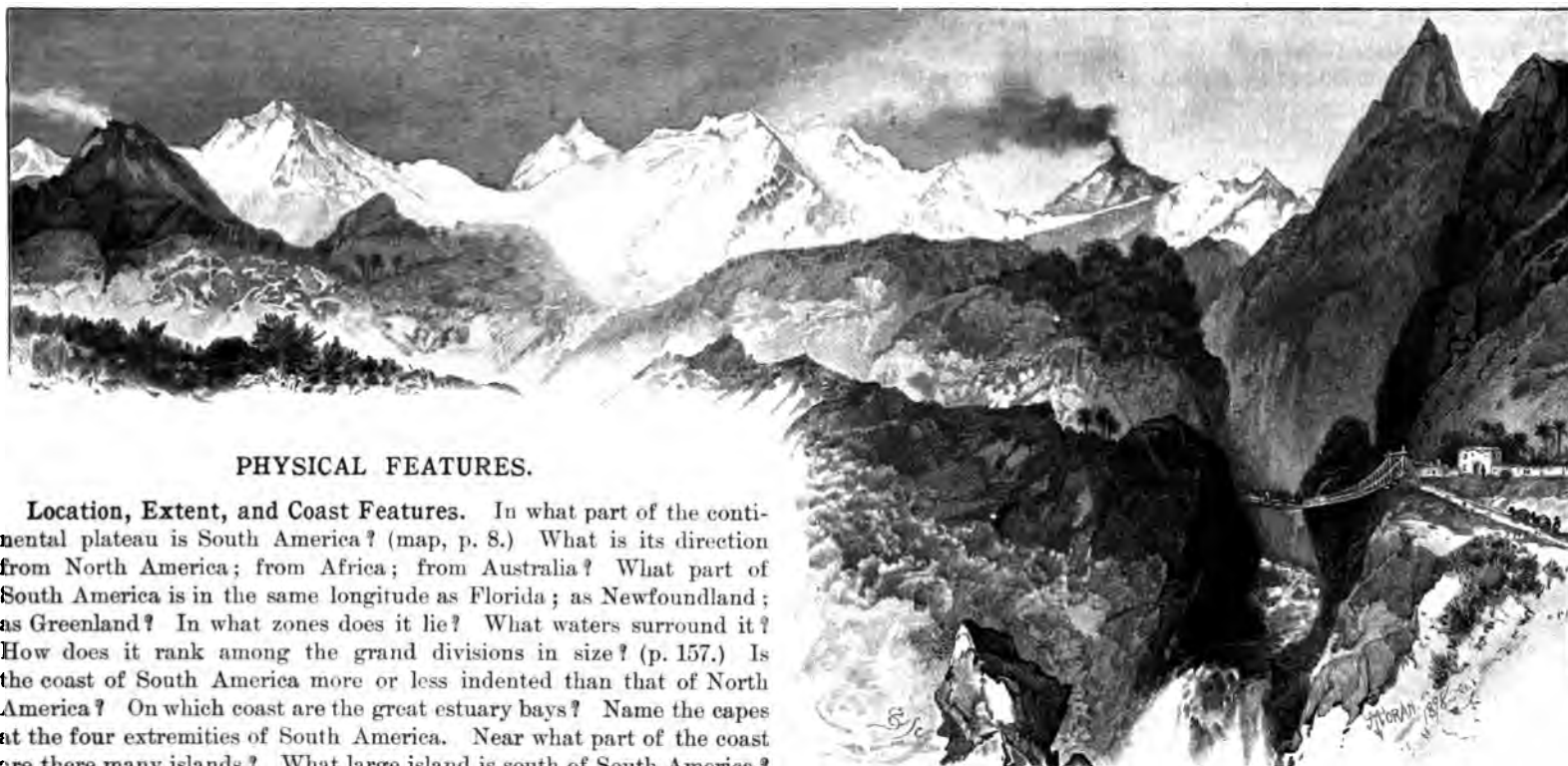
Where are the great manufacturing regions of North America? Where are these articles made: cotton goods, woolen goods, clothing, silk goods, boots and shoes; lumber, rubber goods, pitch and rosin; steel ships, iron and steel, glass, cutlery, pottery, kerosene; butter and cheese, packed meat, canned fruit, canned fish, refined sugar, flour, tobacco?

Tell the chief trade advantages of each country of North America. Make a list of the chief trade centers, and tell the advantages of each. Show that surface forms affect railroad routes. Point out some important canals and tell their uses.

Make a list of the capital cities in North America. Describe one capital. What is a capital? Make a list of the large cities of North America about which you know some historic associations; about which you can tell the reason for their positions or importance. What are the parts of a city; its uses?



SOUTH AMERICA.



PHYSICAL FEATURES.

Location, Extent, and Coast Features. In what part of the continental plateau is South America? (map, p. 8.) What is its direction from North America; from Africa; from Australia? What part of South America is in the same longitude as Florida; as Newfoundland; as Greenland? In what zones does it lie? What waters surround it? How does it rank among the grand divisions in size? (p. 157.) Is the coast of South America more or less indented than that of North America? On which coast are the great estuary bays? Name the capes at the four extremities of South America. Near what part of the coast are there many islands? What large island is south of South America? By what strait is it separated from the mainland? Is the submerged part of the continental plateau wider off the east or off the west coast?

Surface. Review the lesson on the highlands and lowlands of the world (p. 10). Where is the great highland region of South America? Compare it with that of North America in length; in width; in nearness to the coast; in general direction. What plateaus are in the eastern part of South America? Compare them with the eastern highlands of North America in size and position. Compare the great lowland of South America with that of North America in position; in size. Which has the greater area lower than 1,000 feet elevation?

The Andes Mountains are much loftier than the ranges of the North American highland, and are much less broken. They follow the north and west coasts as a continuous wall, from the vicinity of the island of Trinidad nearly to the Strait of Magellan. Except near the extremities there are few passes across the chain less than two miles high, while many of the peaks are four miles in height, and are the highest in America. Even in the torrid zone these lofty peaks always bear snow and glaciers near their summits, and in the south glaciers descend to the sea.

Thirty or forty active volcanoes occur along the Andes, and many of the high peaks are huge volcanic cones. Severe earthquakes are common throughout the chain, and sometimes cause great loss of life. On the west slopes of the Andes are many terraces and shell deposits high above present sea level, marking old positions of the sea beach. What movement of the earth's crust is probably occurring in this region?

Andes Mountains.

In the north the Andes consist of three ranges separated by long river valleys. Near the equator they narrow to a single high range. South of the equator the highland widens and is bordered by two lofty ranges, which form the rims of the highest plateau on the continent. What is its name? It is about $2\frac{1}{2}$ miles high. South of the plateau of Bolivia the Andes extend as a single great range to the Strait of Magellan, but in the south they are cut entirely through in several places by the deep valleys of streams flowing into the Pacific. This great range is bordered on the west by a much lower and more broken range close along the coast.

The northern part of the plateau of Bolivia is extremely rugged, and is traversed by deep valleys draining northwardly. The southern part is smoother, for it was once the bed of a series of great lakes which covered much of the region between the bordering ranges, when the climate was moister than it is at present. As the climate changed, the lakes shrunk in size or disappeared entirely, leaving terraces, or old beach lines, to mark their former limits. What is the largest remnant of these former lakes? It is about half as large as Lake Ontario. What North American lake has had a history similar to that of Lake Titicaca?

The Brazilian plateau is much lower than the Andean highland. Its general height is less than half a mile. Much of its surface is quite level, but there are numerous rugged divides and several mountain ranges, with at least one peak two miles high. The plateau slopes abruptly in the east to a narrow coast plain, but inland it merges gradually into the great central lowland. In what direction does the highland of Guiana extend? The eastern highlands of South America, like those of North America, are much older than the western highlands.

Between the highland regions, extending the entire length of the grand division, and from the Andes to the Atlantic, is a vast lowland plain. Low divides extend across this lowland from the Andes to the eastern highlands, separating its surface into a northern, a central, and a southern slope. In what general direction does each descend? The slopes, however, are so gradual and the divides so low that they are quite imperceptible, and the characteristic features of nearly the whole region are its flatness and its slight elevation above sea level.

There are very few old, hard rocks exposed on the level surface of this lowland, which is mostly covered with a fine clayey soil. Many people believe that much of this region was formed beneath a shallow sea by sediment worn from the adjacent highlands, and was upheaved in comparatively recent times, like the Tide-water region of our Atlantic coast. Parts of the region, especially in the south, are still rising, but parts of the northeastern and southeastern coasts are thought to be now sinking.

Climate. Review the lesson on the heat belts (pp. 24, 25). What part of South America is always hot? What part has temperate winters and hot summers? What parts are always temperate? Mention some part of South America that is always cold. Mention a South American winter month. Review the lessons on winds and rainfall (pp. 26, 27). What winds prevail over the northern part of South America; over the southern part? Over what part of South America does the equatorial rain belt lie in January? Where does it lie in July? Where do the tropical calms cross South America? What parts of South America have heavy or moderately heavy rainfall? Why? What parts have light rains or little or no rain? Why? In which half of the year do you think that most of the rain falls in South America? Why?

There is comparatively little difference between the temperatures of winter and summer in South America. Most of the lowlands are always hot; in the extreme south they are stormy, chilly, and disagreeable, but seldom very cold; the elevated plateaus of the Andes are always temperate, and the higher summits of this chain always cold. It is only in a comparatively narrow central belt that there is a notable difference between the temperatures of summer and winter, and in this region the winters are seldom cold enough for the formation of ice.

The most plainly marked seasons are the wet and the dry, and they are determined by the position of the equatorial rain belt.

In our summer the rain belt lies north of the equator, and at this season there is generally least rain in South America. As the rain belt sweeps southward in our fall and winter, and northward again in our spring, it yields the heavy daily rains which make the rainy season. At all times the southeast or the northeast trades blow far inland and discharge heavy rains wherever they are forced to rise. Hence the east slope of the Andes in the torrid zone is one of the rainiest regions in the world. The Pacific slope, however, south of the rain belt, receives only the winds which have lost their moisture on the east slope, and therefore this region is one of the driest in the world. In the south, where

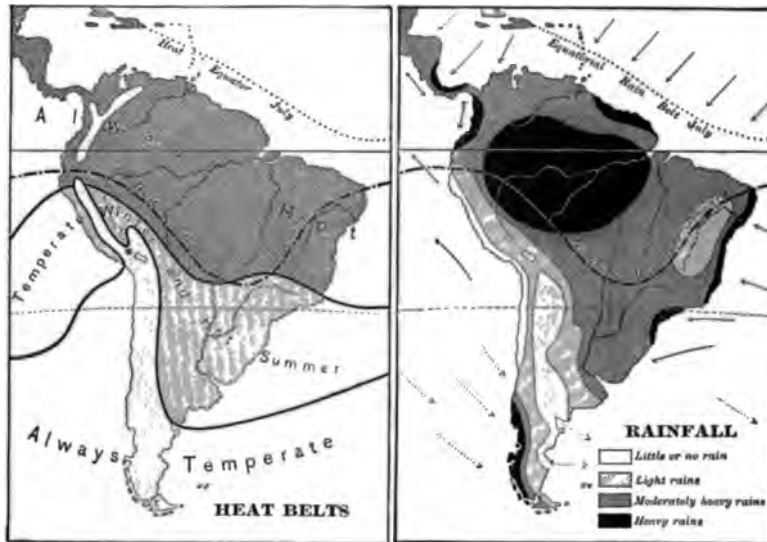
westerly winds prevail, the west slope receives a heavy rainfall, while the region east of the mountains is quite dry.

Drainage. Trace the continental divide of South America. Trace the divides of five river basins which together embrace nearly all of the Atlantic slope, except its southern extremity. Which of these basins is largest? How does the Amazon basin compare in size with the largest river basin in North America? Compare these basins in amount of rainfall, and number of tributary streams. From these comparisons do you think the Mississippi-Missouri or the Amazon is the largest stream? What is the next largest river basin of South America? Compare it with the Mississippi basin in size and rainfall. Do you think the Mississippi or the Plata discharges more water into the sea? Name and locate the three other great basins of South America. How do you think they compare with the Yukon or the Colorado River in the amount of

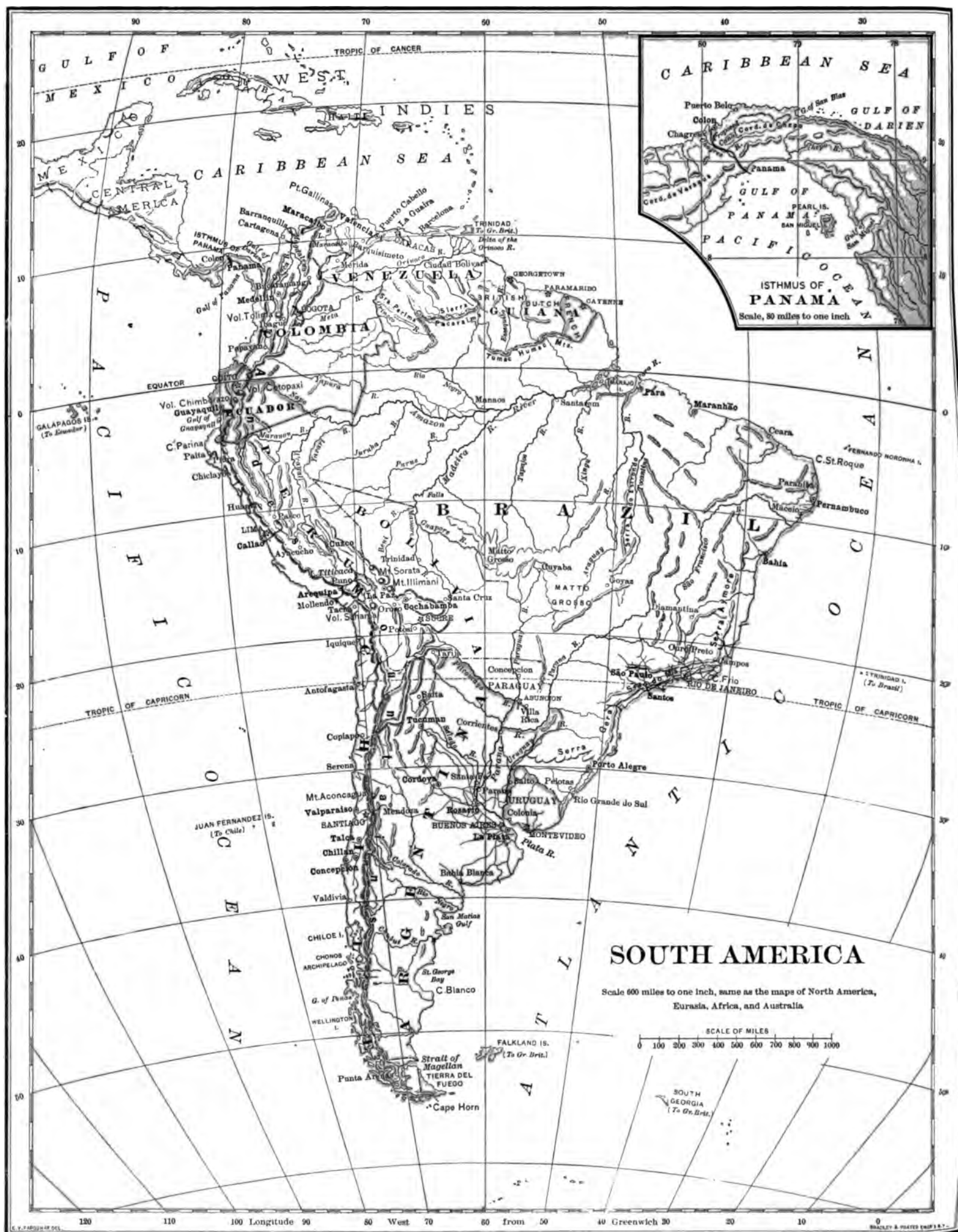
water they carry? Why? Why are there no long rivers on the Pacific slope of South America?

The enormous amount of rain which falls on the Atlantic slope of South America gives to it some of the greatest rivers in the world. The Amazon, while not so long as the Mississippi-Missouri, has a larger basin and discharges much more water into the ocean. It is much the largest river in the world.

The great river is several miles wide and is deep enough for the largest ocean steamers for more than a thousand miles above its mouth; large steamboats can ascend to the very foot of the Andes. When the river is flooded after the rainy seasons, it spreads out over the flat lowland to a much greater width, and it has built up a very wide flood plain, which is traversed by many broad, deep bayous. Name the two largest tributaries from the north. Count the large tributaries from the south. Name the largest. Find the Tocantins River. What is its estuary called? By what is it separated from the main estuary of the Amazon? As it is thus separated, the Tocantins-Para River is sometimes not included in the Amazon system, though its estuary is connected with the Amazon and is always used by steamers ascending that river from the ocean. The main Amazon estuary, north of Marajo Island, is filled with rocky islands and is quite shallow near its mouth. Why? No well-marked

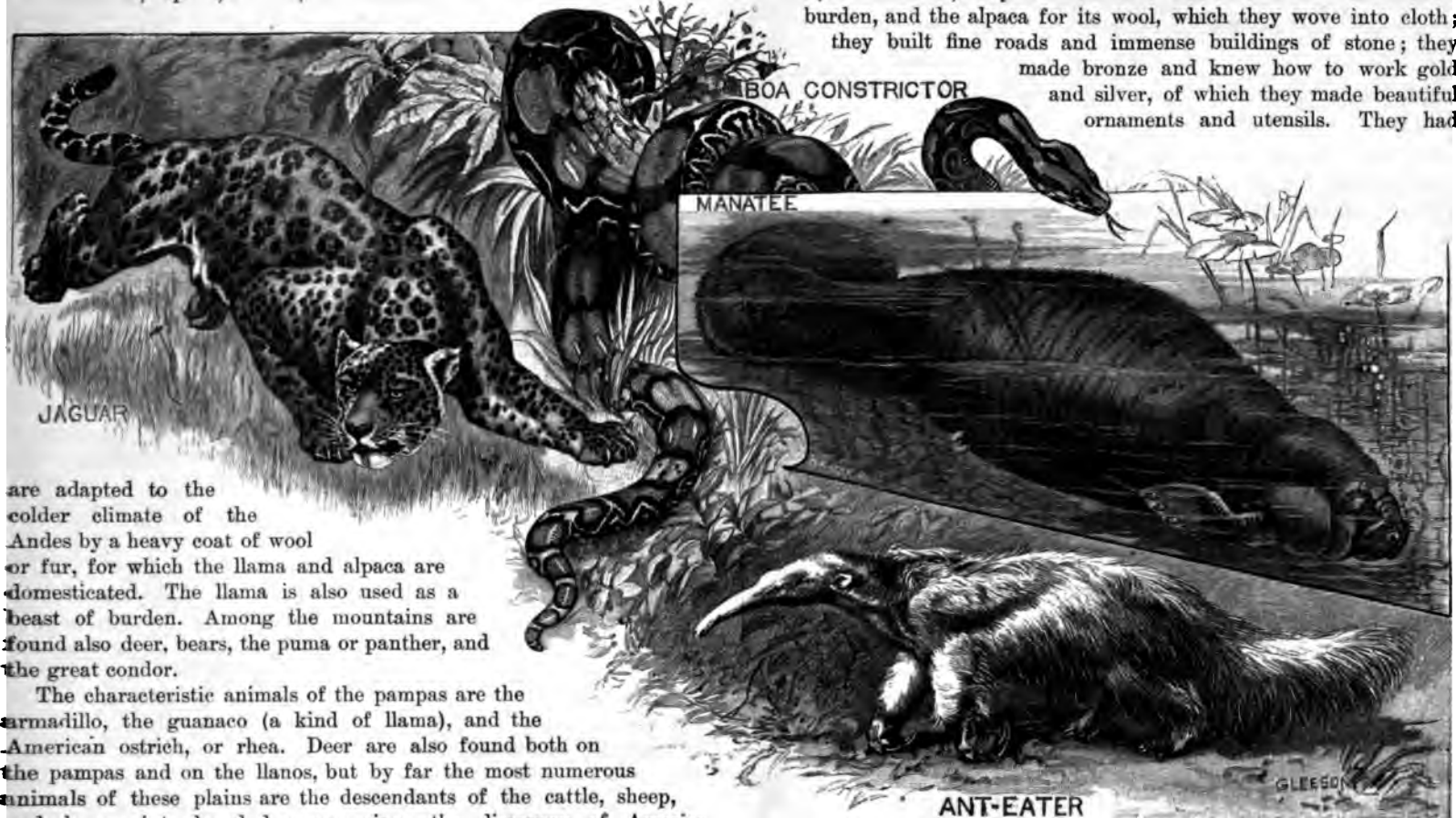


On the lower Orinoco River, Venezuela.



bear, and boa constrictor. Among the smaller animals are various kinds of monkeys, sloths, peccaries, and ant-eaters; many kinds of humming birds, parrots, and other gorgeously colored but generally songless birds; and countless insects and reptiles. In the rivers are found the whale-like manatee and many great alligators.

The llama, alpaca, vicuña, and little chinchilla



Some animals of South America.

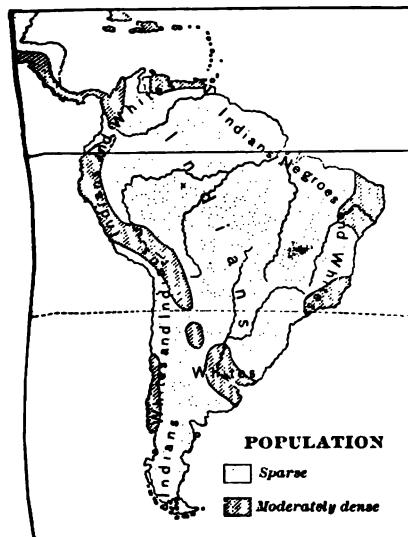
are adapted to the colder climate of the Andes by a heavy coat of wool or fur, for which the llama and alpaca are domesticated. The llama is also used as a beast of burden. Among the mountains are found also deer, bears, the puma or panther, and the great condor.

The characteristic animals of the pampas are the armadillo, the guanaco (a kind of llama), and the American ostrich, or rhea. Deer are also found both on the pampas and on the llanos, but by far the most numerous animals of these plains are the descendants of the cattle, sheep, and horses introduced by man since the discovery of America.

Supplemental Work. Describe one plant of South America; one animal. Write a reproduction of the description given by one of your schoolmates. Read "What Mr. Darwin Saw."

MAN.

Compare South and North America in area; in population (p. 157). Calculate the average number of people to the square mile, or the density of population, in each. If the people of the world were evenly distributed over the land, South America would have six times its present population. What parts of South America are most densely



peopled? Tell one reason why so few people live in the central region; in the southern region. What races live in South America? Where do the whites live chiefly? Where are nearly all the people Indians? Where are there many negroes?

Peoples and Countries. When Columbus discovered the New World there were probably more Indians in South America than in North America. Those of the lowland were generally savages, but those of the Andes highland had

made greater progress than any others in America, having nearly reached the lowest stage of civilization.

The most advanced tribe were the Incas, who lived near Lake Titicaca. With the aid of irrigation and fertilizers they cultivated corn, potatoes, and cotton; they had domesticated the llama as a beast of burden, and the alpaca for its wool, which they wove into cloth; they built fine roads and immense buildings of stone; they made bronze and knew how to work gold and silver, of which they made beautiful ornaments and utensils. They had

conquered nearly all the tribes of the Andes region and formed them into a great confederacy or nation, which numbered several million people.

The Spaniards who followed Columbus to the north coast of South America in search of gold heard of the gold-working Incas, and soon conquered them and established themselves throughout nearly the whole Andes highland as far east as the Orinoco. Spaniards also made settlements in the Plata valley.

Meanwhile navigators from Portugal, a country lying next to Spain in southwestern Europe, explored and conquered much of the east coast, which came to be called Brazil. Here the Portuguese made the first agricultural settlements in America, to which they brought thousands of negro slaves from Africa.

Thus most of eastern and central South America was claimed and settled by the Portuguese, while the Andes region and the lower part of the Plata basin were claimed and settled by Spaniards. On the northeast coast the English, French, and Dutch founded a few small settlements.

The Spaniards and the Portuguese enslaved the Indians, forced them to work in the mines or on the plantations, and often treated them cruelly. But many white settlers married Indian women, and in the east many negroes and Indians also intermarried, so that now fully one third of the people of South America are of a mixed race. About one third are pure-blooded whites, and the rest are Indians

and negroes. Slavery has been abolished, but most of the manual labor is performed by the mixed races and the negroes.

The King of Spain ruled his South American colonies so harshly that finally they rebelled, and after long wars became independent republics, in which the Spanish language still prevails. About the same time the Portuguese colonists declared their independence of Portugal, and formed the only independent monarchy that has ever existed in America. In 1889, however, their country became a republic, in which the Portuguese language is still spoken.

Name the Portuguese republic; the nine Spanish republics; the three European colonies. Brazil, Argentina, and Venezuela are composed of states or provinces in which, as in our states, the officers are elected by the people and are nearly independent of the federal government in local affairs. The other republics are divided into provinces or departments for which the central government appoints the officers. There have been frequent wars in all the republics over the working of their governments, and nearly all have fought with one another over their boundaries, few of which are yet definitely settled. On account of these wars the countries have not advanced in wealth and importance so rapidly as the United States. Still, much progress has recently been made. Slavery having been abolished, free settlers are coming in thousands from Europe. Some railroads have been built; the larger cities are provided with street cars and electric lights; and schools and colleges have been established. Catholic missions were early founded among the Indians, and most of the people in South America profess



Coffee plantation, southern Brazil.

that faith; but other religions are permitted by law in all the countries except Peru and Ecuador.

Industries and Products. The chief industries in South America are herding, agriculture, and mining. Where are the chief pasture lands? The valleys of the Plata River system, the southeastern part of the Brazilian plateau, and the river valleys along the northern coast of the grand division are the chief agricultural regions. In the torrid zone, coffee, corn, sugar, cotton, cacao, cassava, and tobacco are grown; in the temperate zone, wheat, corn, and barley. Gold, silver, and copper are mined in the Andes region, but the chief mineral product is nitrate of soda, useful as a fertilizer and in making gunpowder. This is obtained from old lake beds on the dry western slope. In the eastern highlands also some gold is found.

Most of the foreign trade is with the United States and

Europe. We get most of our coffee and rubber, much wool and sugar, and many hides from South America, to which we send flour and some manufactured goods, for comparatively little manufacturing is done there. Most of the South American imports come from Great Britain, Germany, and France, to which countries wool, beef, mutton, wheat, coffee, gold, silver, nitrates, and forest products are exported in return.

Where are most of the railroads in South America? (p. 106.) These carry the agricultural and animal products to the seaports, while the railroads in the north and west carry the products of the mines to the coast.

Where is the continent crossed by a short railroad? Though short it is one of the most important railroads in South America. Why? In the south another transcontinental road is completed, with the exception of a few miles in the Andes. Throughout the central region the Amazon with its tributaries is the great commercial route, by which rubber and other forest products are carried from the very base of the Andes to the seaport at the river mouth.

THE UNITED STATES OF BRAZIL. In what part of the grand division is Brazil? What countries border it? What South American countries do not? Trace the chief divides of Brazil. What river basins do they separate? Describe the surface; the climate; the chief rivers. What is the history of Brazil? Name and locate the capital; four cities north of the capital; two south.

Only a small part of Brazil, mostly in the southeast, is cultivated. The most valuable crop is coffee, of which Brazil produces more than all the rest of the world. It is grown on the uplands north and west of Rio de Janeiro. Farther north, along the coast, sugar, cotton, and tobacco are raised. Much corn and cassava are cultivated, and they form the chief food of the laboring classes. In the Parana valley an herb called maté is extensively grown. Its leaves are much used in South America as a substitute for tea.



Herding cattle on the pampas, Argentina.

What products do the silvas supply? In the extreme south the herding of cattle is the chief industry.

Rio de Janeiro, the second city of South America in size, is about as large as Boston. It has one of the few fine harbors of South America, and ships much coffee, mostly to the United States. What city is west of Rio? It is in the coffee region, and is the educational center of Brazil. Its port, *Santos*, ships more coffee than Rio, but chiefly to Europe.

Bahia and *Pernambuco*, each about as large as Detroit, are the ports of the sugar and tobacco district. *Para* is the great rubber-shipping port, and *Maranhão* ships raw cotton. *Porto Alegre* exports dried beef and hides.

ARGENTINA. What countries border Argentina? How does it rank in size among South American countries? Describe its surface; its chief rivers. What is the capital? Name three cities of the interior.

Argentina is the most prosperous of the Spanish republics. It has more railroads than Brazil, and is being rapidly settled by Italians and other southern Europeans. It is one of the great wool-, beef-, and mutton-exporting countries of the world. Hides, tallow, and other animal products are also exported, as well as much wheat from the lower Parana valley. In that region large crops of wheat, corn, and flax are raised, and



Public gardens, Bahia.

there are extensive sugar plantations and vineyards, as well as many flour mills and wine-making establishments.

Buenos Aires, the largest city of South America, ranks between Boston and Philadelphia in size. One half of the population are Europeans. Its harbor has been deepened at heavy cost. It is the great seaport of the republic and of nearly the whole Plata valley. What city in our country has similar commercial advantages? *Rosario*, *Cordova*, and *Tucuman* are much smaller trade centers.

URUGUAY. What countries border Uruguay? Describe its surface and drainage. What is its capital?

Though the smallest republic in South America, Uruguay ranks fourth in the value of its foreign commerce. Its industries are the same as those of Argentina. *Montevideo*, the chief commercial city, is about one third the size of Buenos Aires.

PARAGUAY. What countries border Paraguay? In what zones is it? By what rivers is it drained? What is the capital?



Public square, Buenos Aires.



Harbor of Rio de Janeiro.

Cattle raising is an important industry, but the climate is too warm for sheep. Maté, or "Paraguay tea," is extensively cultivated, as well as corn, cassava, tobacco, and sugar cane, the women working the crops, and the men gathering the maté leaves and herding the cattle. Lumbering is carried on in the extensive forests. *Asuncion* is the chief trade center.

CHILE. By what is Chile bordered? Describe the surface of Chile. What peak is near the center of its eastern boundary? It has an elevation of about $4\frac{1}{2}$ miles, and is the highest point of the Western Continent. Explain the difference between northern and southern Chile in temperature, rainfall, and vegetation. What is the capital? What seaport is near it? Name three cities further south. Name two seaports in the north.

Because of differences in climate, northern, central, and southern Chile differ greatly in aspect and in industries. In the warm northern deserts mining is the chief industry. Silver, copper, and gold are mined, and from the old lake beds between the Andes and the coast ranges great quantities of nitrate of potash are obtained. Six sevenths of the people live in the central region of moderate rainfall, where agriculture and the herding of sheep and cattle are leading industries, and fine crops of wheat and barley, grapes and other fruits are raised. Coal is mined and exported from the coast range south of Concepcion. In the southern region of heavy rainfall lumbering is becoming an important industry, though Chile imports much lumber from the United States. Coal and gold are also mined in the south, near Punta Arenas. Chile ranks third in commerce among the South American countries. More than half the exports are nitrates; then come silver, copper, wheat and barley, and iodine. Most of the trade is with Europe.

Santiago, the largest city, is about the size of Cincinnati. It is almost half a mile above the sea, and fifty miles inland. Like most of the larger cities of South America, it was founded within fifty years after the discovery of



Santiago, Chile.

America, and is therefore much older than any city in the United States. Because of earthquakes, the houses, as in all the cities of the Andes region, are generally low and the streets wide. *Valparaiso*, the largest Pacific port of South America, is the chief importing point of Chile. Most of the minerals are shipped from *Iquique*. Why?

BOLIVIA. What countries border Bolivia? In what respect does Bolivia differ from all other South American countries except Paraguay? Describe the surface. What is the capital? Locate two other cities.

The eastern range of the Andes is wide and exceedingly rugged in Bolivia. Several of its vast volcanic cones are nearly as high as Mt. Aconcagua. In these mountains are mined great quantities of silver and tin, which are exported chiefly through the Chilean port of Antofagasta. Most of the imports come through the Peruvian port of Mollendo. Both ports are connected by railroads with the plateau. On the plateau wheat, corn, barley, beans, and potatoes are raised for local consumption, and cattle, sheep, and llamas are herded. Cinchona, cacao beans, and rubber are gathered from the forests of the east slopes and exported by way of the Madeira and Paraguay rivers.

La Paz is the largest town and the usual seat of government. The city is built in a deep gorge, through which Lake Titicaca once found an outlet into the Amazon system. *Sucre*, not far from the rich silver mines of Potosi, is the constitutional capital.



La Paz, Bolivia.

PERU. What countries border Peru? What great river rises in Peru? Describe the surface. In what three climatic regions does Peru lie? Locate the capital. What city is in the south? What city lies on the plateau?

Few people live on the desert coast, because it is so dry, or in the inland forests, because they are so wet. Much sugar and cotton are grown, by the aid of irrigation, in the valleys of the west slope, and they form the chief exports. On the plateau silver is mined, the same kinds of food plants are raised as in Bolivia, and llamas, alpacas, and goats are herded. Some wool and silver are also exported. On the east slope, rubber, cacao beans, and cinchona are gathered. There are rich petroleum wells in the north, and extensive deposits of guano along the desert coast. Three fourths of the people are of Indian descent.

Lima, the largest city, is about the size of Indianapolis. It is six miles from the ocean and about 600 feet above it. What is its seaport? *Arequipa* is an important railroad town, more than one and a half miles above the sea. *Cuzco*, the chief town of the plateau region, was the old capital of the Incas.



The Cathedral, Lima.

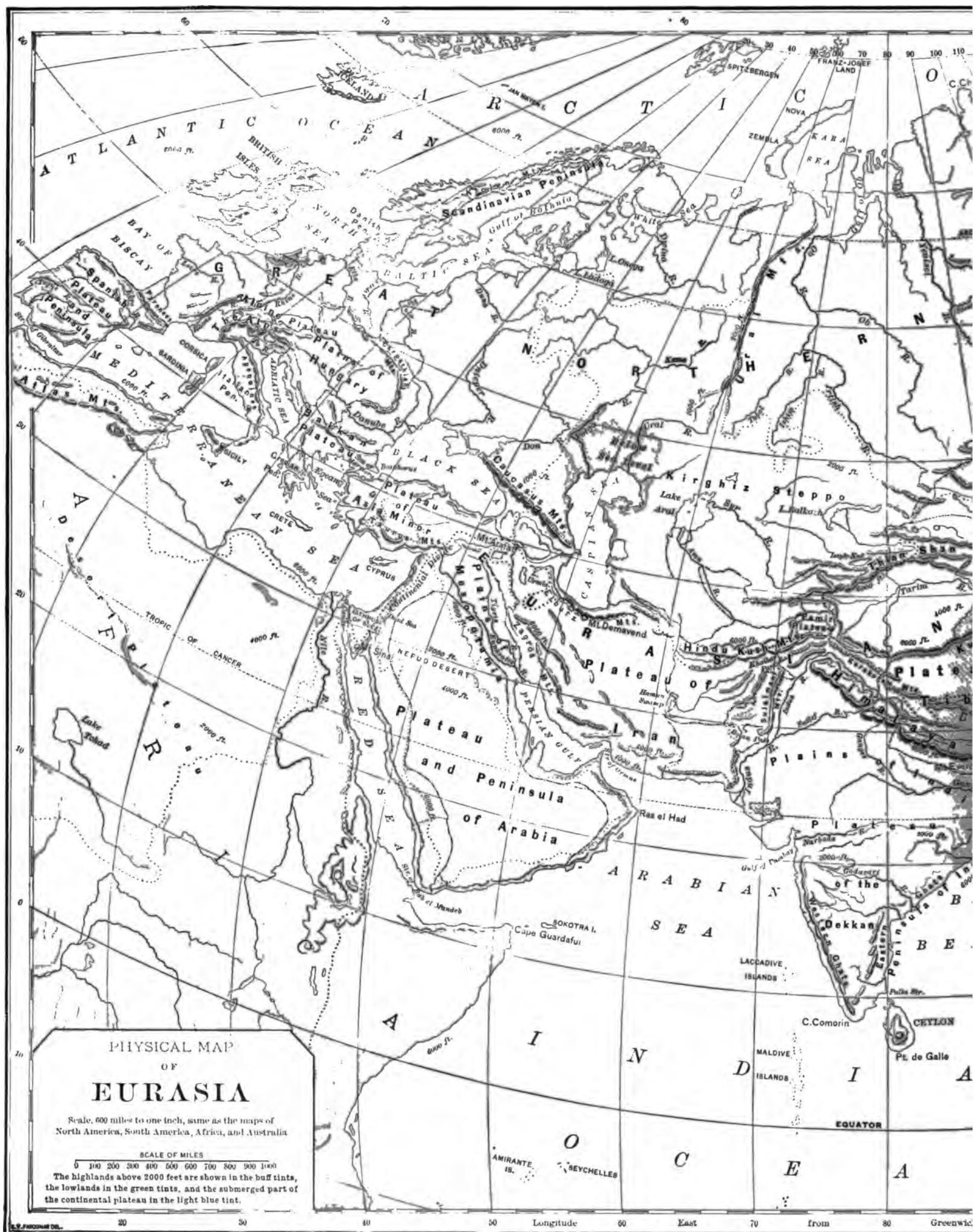
ECUADOR. What countries border Ecuador? Describe its surface. Name two volcanoes. What is the capital; the chief seaport?

Ecuador has but little commercial importance. It claims large areas to the east which have been occupied by Colombia and Peru. Cacao is cultivated on the Pacific slope and is the chief export, though some coffee is also exported. *Quito*, the largest town, though nearly on the equator, is about two miles above the sea and has a delightful climate. *Guayaquil* is the principal commercial city.

The *Galapagos* group of thirteen volcanic islands belongs to Ecuador. The lower slopes are dry and nearly bare of vegetation, but the upper slopes receive ample rainfall and are covered with dense tropical forests. There are few inhabitants.

COLOMBIA. By what countries and waters is Colombia bordered? Trace the divides between the Pacific, Caribbean, and Atlantic slopes. Describe the surface. What is the capital? Name two other cities.

Most of the people live in the upper valleys of the Cauca and Magdalena rivers. On the hot lowlands cassava and bananas are cultivated; at more temperate elevations, corn, potatoes, tobacco, and cacao; and on the cool high-



PHYSICAL MAP
OF
EURASIA

Scale, 600 miles to one inch, same as the maps of
North America, South America, Africa, and Australia

SCALE OF MILES

0 100 200 300 400 500 600 700 800 900 1000

The highlands above 2000 feet are shown in the buff tints,
the lowlands in the green tints, and the submerged part of
the continental plateau in the light blue tint.

W. P. FISHBURN DEL.

Longitude 20 30 40 50 60 East 70 from 80 Greenwich

EURASIA.

PHYSICAL FEATURES.

Extent and Coast Features. In what part of the continental plateau is Eurasia? (map, p. 8.) Between which grand divisions of land does it lie? By what is it separated from or connected with each of the three? How does it compare with North America in size? (p. 157.) What part of the land surface of the world does it embrace?

On the map, pp. 112, 113, connect with straight lines the most northeastern, southeastern, and southwestern points of Eurasia. Which of the three sides of the grand division has the most regular coast line? Name four seas, two gulfs, and a bay which border the northern coast. What two peninsulas project from it? What large islands are near it?

Which is the most irregular coast of Eurasia? What four seas border it west of the isthmus of Suez? With what ocean are they connected? What three peninsulas project from this part of the coast? Name five large islands in the Mediterranean Sea. Name two seas, a gulf, and a bay which border the coast east of the isthmus. With what ocean are they connected? What three great peninsulas do they border?

Name six seas and a gulf on the east coast. Of what ocean are they a part? What peninsulas project from this coast? What island groups are south and east of the South China Sea? What long island chain is north of the Philippine Islands?

Surface. Review the lesson on highlands and lowlands (p. 10). In what part of Eurasia are nearly all the highlands? Compare them with the American highland in length; in width; in direction. Name four large plateaus of the Eurasian highland; five smaller plateaus. What part of Eurasia is an almost continuous lowland plain? By what mountain range is it divided? By what oceans is it bordered? How do the Pacific and Indian Ocean slopes of Eurasia compare with the Pacific slope of America in amount of lowland? Name three lowland plains on the Pacific slope of Eurasia; two on the Indian Ocean slope. Name a great detached plateau of this slope.

The Highlands. The great Eurasian highland extends as a continuous region of elevation from Bering Strait to the Mediterranean Sea. It is cut entirely through by the outlet from the Black Sea, but extends through southern Europe as a broken and much narrower highland to the Spanish peninsula. In central Asia this vast highland is as wide as the United States from San Francisco to Chesapeake Bay. There is no continuous mountain chain traversing the great highland, as in America, but from Bering Strait to the Strait of Gibraltar there is a broken succession of mountain ranges. Between them are broad desert plateaus which differ greatly in elevation. The small, rugged Pamir plateau and the extensive but smoother plateau of Tibet are about three miles in elevation, while the great plateaus to the northeast and southwest of them are not one third as high. The mountain ranges rise from one to three miles above the surface of the plateaus, and some of them are the highest in the world.

What three ranges extend eastward from the Pamir region, forming the borders of the plateaus of Tibet and Mongolia? These are the loftiest mountains in the world. The upper third of their slopes is always covered with snow, from which great valley glaciers extend much lower. Mt. Everest, in the Himalayas, is the highest measured peak, and has an elevation of 5½ miles, but there are many peaks nearly five miles high in each of these chains.



What two chains are in the northern part of the plateau of Mongolia? What chain forms its eastern border? What is this chain called north of the Amur River? These chains are lower than those nearer the Pamir plateau, but the snow-clad peaks of the Altai range are three miles high.

What three chains form the northern border of the highland west of Pamir plateau? The Hindu Kush is a snow-capped range about four miles high. The other chains are lower, but they contain lofty peaks, and the upper valleys of the Caucasus are filled with glaciers. What chains border the plateau of Iran on the east and on the southwest?

What plateaus and ranges compose the Eurasian highland in southern Europe? Of these the Alps and the Pyrenees are snow-clad, and have peaks between two and three miles high.

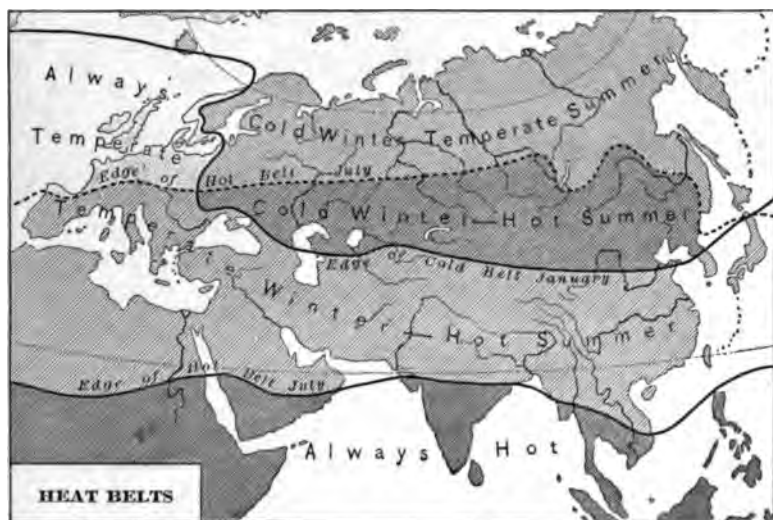
What two mountain ranges are in the great northern lowland? These ranges are scarcely a mile high. The Urals are a gradual swell in the great plain. The Kiolen Mountains slope gradually to the east, but their abrupt western slope forms the bold, rocky coast of the Scandinavian peninsula. Great glaciers descend from them to the sea.

What plateau occupies the peninsula of India? It is composed of old outflows of lava like those of the Columbia plateaus.

Earthquakes are not uncommon throughout the Eurasian highland, and they indicate that its upheaval may still be in progress. There are many old volcanic rocks in the highland region, but comparatively few active volcanoes on the mainland of Eurasia, and these are widely separated—one is on the Italian peninsula, two or three near the Caspian Sea, one or two northeast of the Pamir plateau, and several on the peninsula of Kamchatka. About 150 active volcanoes, however, occur on the long chain of mountainous islands which rise from the submerged edge of the continental plateau east and southeast of Asia. This region is the greatest center of volcanic activity in the world. It is shaken by earthquakes almost constantly. Probably no other part of the continental plateau is being upheaved so rapidly.

The Lowlands. Most of the great northern lowland has an elevation of less than 500 feet, and in places it is actually below sea level. Find such a place. In general its flat surface is broken only by the low bluffs which border the broad flood plains of the streams.

The detached lowland plains to the east and south of the great highlands are composed of alluvium washed from the bordering mountains, and their upheaval is thought to have been comparatively recent.



Climate. Review the lesson on the heat belts (pp. 24, 25). In what five heat belts does Eurasia lie? What part of Eurasia lies in each heat belt? To which other grand division is Eurasia similar in the general distribution of its heat belts? Review the lessons on winds and rainfall (pp. 26, 27). Where are the largest regions of heavy or moderately heavy rainfall in Eurasia? Where are the regions of light rains or no

rain? What is peculiar about the winds of southern and southeastern Asia? (p. 26.) What effect have these winds and the highlands upon the rainfall of this region; upon the rainfall of central and southwestern Asia? What are the causes of the moderately heavy and the light rainfall in western and northern Eurasia?



Because of the greater extent of Eurasia the extremes of temperature in the interior are greater than in North America. Why? The coldest winters in the world occur in northeastern, and nearly the hottest summers in southwestern Asia. Thus, with the exception of the southern and the western parts, Eurasia is characterized by excessive temperature changes during the year. Even in the hot belt there is a chilly season when the dry winds blow southward from the highlands. The summer heat and the winter cold in the west are tempered by the prevailing winds from the Atlantic.

In the south and southeast the monsoon winds (p. 26) blowing from the sea in summer yield copious rainfall on the seaward slopes, while little rain falls at other seasons, when the winds blow seaward. The sea winds lose most of their moisture on the seaward slopes of the ranges bordering the great highlands, so that the plateaus and lowlands behind these ranges receive little or no rain and are therefore deserts. The westerly winds, with the cyclonic storms, yield ample rainfall at nearly all seasons over western and central Europe, but have little moisture left when they reach northern Asia.

Drainage. Beginning in the Khingan Mountains trace a continuous line around a great central region of Eurasia whose drainage does not reach the ocean or any of its arms. Locate this region on the rainfall map, and tell why it is a region of "interior drainage." Does any rain fall in this region? Does the rainfall give rise to any streams? What becomes of these streams? (p. 15.) Is the water of these lakes fresh or salt? Why? What is the largest sheet of water in this region? What two large tributaries has it? If the rainfall of Central Asia were sufficiently heavy, part of this great interior basin would be drained to the Pacific, part to the Indian Ocean, and part to the Atlantic Ocean through the Caspian, Black, and Mediterranean seas. What other part of Eurasia sends no drainage to the sea? What three large rivers of Eurasia flow to the Arctic Ocean? What four flow to the Pacific Ocean? Name four that flow to the Indian Ocean. Name three that flow to the Atlantic Ocean, through the Black Sea. Do the Eurasian rivers flowing to the Arctic and those flowing to the Indian Ocean have their sources near together? Why not?



Some animals of Eurasia.

laurels, and myrtles are common trees on the lower and moister slopes, while firs, pines, and other trees yielding resinous gums grow at greater elevations.

This is the true home of the ancestors of the horse, the cow, the camel, the sheep, the goat, and the hog, and great numbers of all these domesticated animals are raised here, while wild animals closely related to them are the most characteristic animals. There are many kinds of wild sheep and goats, antelopes and gazelles, wild boars, camels, asses, and wild oxen, including oxlike, hairy yaks, and hairless buffaloes. There are several kinds of bears among the mountains, while the tiger and the leopard wander northward over the transitional regions as far as to the Amur River in the east and to the southern shores of the Caspian Sea in the west.

The great deserts are almost entirely devoid of surface water for hundreds of miles. In places, however, the ground water comes near enough to the surface to supply the roots of plants. In such a place an oasis of vegetation is formed in the midst of the barren desert. Some oases are many miles in extent and contain springs and running streams, but others are quite small and afford water to the thirsty traveler only by means of shallow wells which have been dug down to the underground supply.

Violent winds at times sweep over the open desert, raising dense clouds of dust and sand, which are carried forward in such immense quantities as nearly to bury any unfortunate travelers overtaken by the storm. Because of such windstorms some parts of almost all deserts are

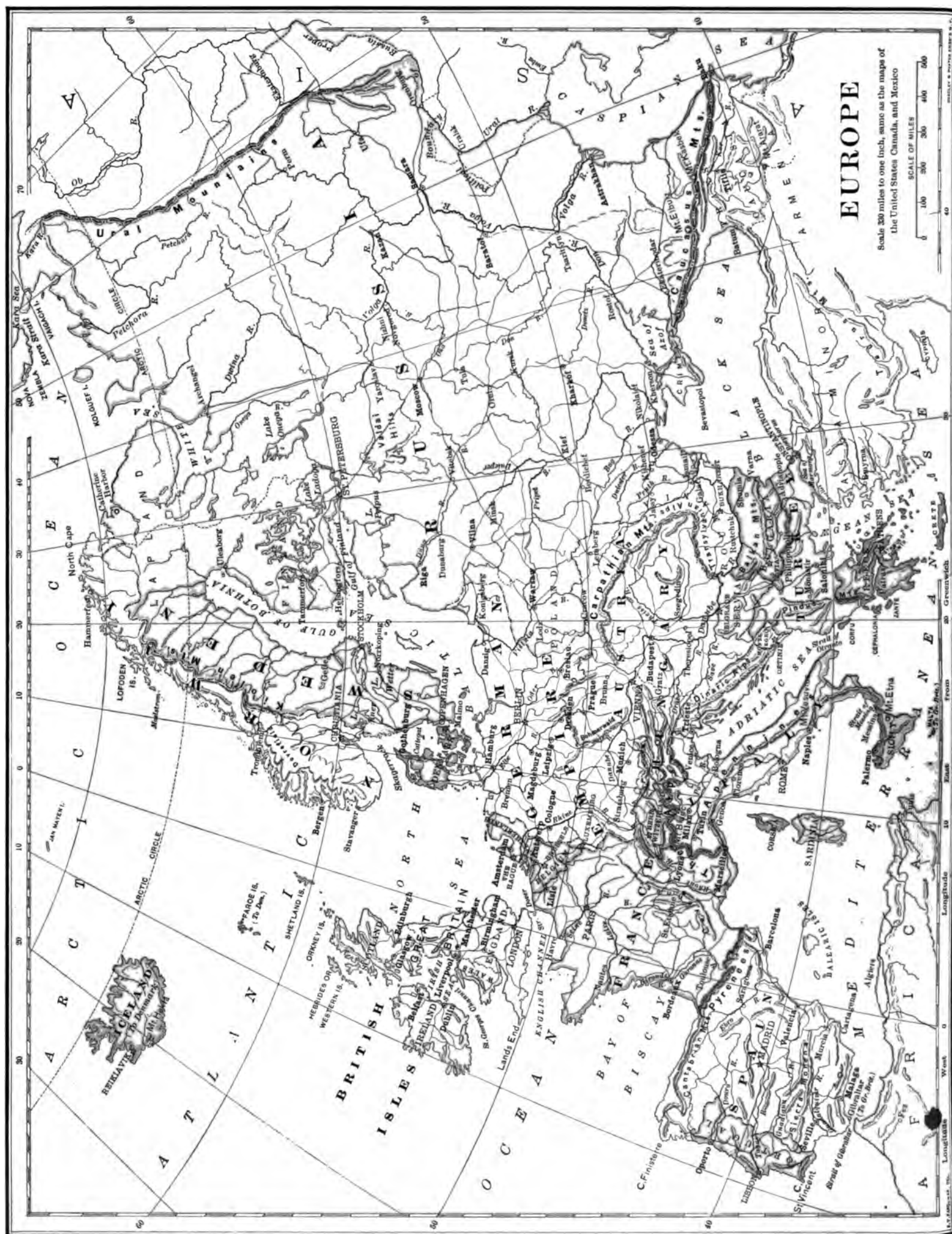
bare and stony, being swept nearly clean of the surface detritus, while other parts are deeply covered with shifting sand dunes.

The dense forests of southeastern Asia have been much reduced by the crowded population, and are now confined to tracts least favorable to cultivation — as marshy lowlands or rough hilly districts. These forests are much denser and more luxuriant than those of the north. In the lowlands are many kinds of palms, bamboos, and trees yielding India rubber, spices, and dyewoods, together with pitcher plants and hundreds of vines growing between the trees, matting them together and forming with the rank undergrowth an impenetrable jungle.

Here the rhinoceros and the wild boar make their homes. Tigers and several kinds of leopards also live in the jungle. These fierce animals wander out into the cultivated lands at night and kill hundreds of people every year, besides thousands of sheep and cattle. Many more people, however, are killed by the bite of the cobra, a venomous snake which abounds in India.

On the higher lands the forests are composed of many fine timber trees, of which the toon, sal, teak, satinwood, and sandalwood are the most valuable. In these forests are found elephants, bears, monkeys, and wild cattle.

Supplemental Work. Make lists of the Eurasian plants and animals which you have seen. Describe one plant and one animal of Eurasia which you have not seen.



Map Exercise on Europe. The Ural and Caucasus mountains and the Caspian and Black seas are often considered the boundaries between Europe and Asia. What is the most northern point of the European mainland? What point on the American mainland is in about the same latitude? What point on the eastern coast of America is in about the same latitude as the most southern point of the European mainland? How does Europe compare with the United States in size?

From the Ural Mountains trace the divide between the northern and southern slopes of Europe. In what physical division does the eastern half of this divide lie? The western half? Into what arms of the sea is the northern slope drained? Name two rivers that flow into the Baltic Sea; two that flow into the North Sea; one that flows into the Bay of Biscay. Into what seas is the southern slope drained? Trace the divide in Europe of the Caspian basin; of the Black Sea basin. Name the two largest rivers of the Caspian basin; the three largest of the Black Sea basin. What river flows into the Adriatic? What two flow into the western part of the Mediterranean?

Through what part of Europe does the great Eurasian highland extend? What mountains and what plains are in the Danube basin? What mountains form the southern divide of this basin? What mountains extend south into the Grecian peninsula? What mountains traverse the Italian peninsula? What mountains are between the Alps and the Pyrenees? Name two ranges of the Spanish plateau. What mountains are in northwestern Europe? What group of large islands is near the west coast? By what is Great Britain separated from the mainland?

Supplemental Work. Sketch Europe, locating its chief mountains, plateaus, plains, divides, rivers, bays, and islands. Model Europe.

mainly from the different ways in which the two regions were civilized. The United States received civilization through the overrunning and settling of the country, during the last 300 years, by a vast number of



Ancient ruins in Rome.

highly civilized, white foreigners, most of whom used the English language. This foreign population absorbed or drove off the comparatively few native Indians and replaced barbarism with its own old and foreign civilization. Civilization, on the contrary, was itself very young and rude when it first appeared in Europe thousands of years ago, and it spread among the many native tribes so slowly that the barbarous natives themselves gradually became civilized, and then, as the centuries passed, they invented the more modern civilization which was carried to America. As among the American Indians, so among the barbarous tribes of Europe there were many native languages. In the United States the native languages and customs were swept away with the Indians, but in Europe various tribes retained their languages and many of their customs as they gradually advanced in civilization.

The languages and customs of neighboring tribes were often some-

what similar but were quite different from those in distant regions, for few people traveled far from home in those days. It was only when some tribe conquered and settled among another people that distant tribes mixed together. In such cases both of the old languages gradually disappeared, while from their blending a new language came to be used by the descendants of the mixed people.

The states of our Union are merely political subdivisions formed mainly for the convenience of local government—many of them having been marked out on paper with straight and regular boundaries before they were settled by civilized men. Most of the countries of Europe, however, are regions inhabited by people who during ages of occupation and contact have become more closely related to one another in language, customs, and history, than they are to the people of the other countries. Hence the boundaries of European countries are very irregular.

Southwestern Europe. Name five countries of the European mainland which have a seacoast and which lie west of the Rhine and the Adriatic Sea. These are called Latin countries because the languages spoken in them are derived from the Latin language used by the ancient Romans.



A Viking's ship.

The Latins were a people of Italy who early received civilization from the Grecian peninsula. They built Rome, which 2000 years ago was the largest and most magnificent city of the world. They conquered and taught civilization to all the tribes of Europe southwest of the Rhine, and added that region to the great Roman Empire, which extended eastward through southern Europe and far into southwestern Asia.

The Christian religion was brought to Rome by the Apostles shortly after the crucifixion of Jesus Christ, and Rome to this day is the residence of the Pope, the head of the Catholic Church; and this form of religion still prevails in all the Latin countries.

Central Europe. Trace a straight line from southeastern Italy to North Cape. What seven countries lie wholly or mostly between this line and the Latin countries? Most of the languages in this region, as well as the English language, which is used in the British Isles, resemble the old German language, and so these countries are often called Germanic or Teutonic countries.

The old Teutonic tribes remained barbarians long after the Romans had conquered and civilized the Latin countries, for though the Romans often fought the Teutons they could never conquer them, but were at last conquered by them. Then followed the "Dark Ages," during which the barbarians overran the civilized Latin countries, but in doing so learned civilization from the conquered people. Two Teutonic tribes, the Angles and the Saxons, whose home was near the shores of the North Sea, crossed to Great Britain and settled in the southern part, which came to be called Angle-land or England, while the blended language of these settlers became Anglo-Saxon or early English. The tribes of the Scandinavian and Danish peninsulas were fearless sea rovers called Northmen and Vikings. They overran all the coasts of the North Sea

and the English Channel and discovered and settled Iceland and Greenland. They probably even visited New England, 500 years before Columbus reached the West Indies.

The Christian religion was spread throughout central Europe by priests and monks belonging to the Catholic Church, but now the Protestant faith prevails in all the Germanic countries, except Austria, which is still mainly Catholic.

Eastern Europe. What great country occupies most of eastern Europe? What six countries occupy the southeastern part? The eastern part of Europe is called Slavonic Europe because nearly all of the languages used show a blending with the language used by the Slavs, a great tribe that once lived northeast of the Carpathian Mountains.

Although Greece was the first European region to become civilized, most of eastern Europe received civilization through central Europe, and was thus the last part of the grand division to become civilized. On this account, and also because it has often been invaded by rude tribes of the yellow race from Asia, it is not so highly civilized to-day as the western half of Europe. By far the greater part of the population are Aryans, but there are many people of the Turkish branch of the yellow race in all these countries.

Throughout most of Eastern Europe the Greek form of the Christian religion is the prevailing faith, but in Turkey and Bulgaria very many of the people are Mohammedans.

Government. While the governments of most American countries are republican in form, there are in Europe but two important republics, France and Switzerland. All the other large countries are monarchies.

In France and Switzerland the ruler is elected from among the common people to hold office for a definite length of time. In the monarchies the ruler belongs to the class of aristocrats or nobles, is a blood relation of a previous ruler, of his own or some other country, and holds office for life. Most of the monarchies are limited (p. 36); only Russia and Turkey are absolute or despotic.

Great Britain, Germany, Russia, France, Austria-Hungary, and Italy are the strongest and most populous nations of Europe, and are often called the "Six Great Powers."

Supplemental Work. Read "The Story of the Greeks" and "The Story of the Romans," by H. A. Guerber; "The Story of Roland" and "The Story of Siegfried," by James Baldwin; "Norse Stories retold from the Eddas," by Hamilton W. Mabie; and "The Passing of Arthur," in Baldwin's School Readers, 5th and 6th years.

INDUSTRIES AND PRODUCTS.

All the great industries are actively pursued in Europe, but by far the largest part of the working population is engaged in agriculture, manufacturing, and commerce.

Agriculture affords occupation to more than half the people. It is pursued in nearly all parts of Europe except in the extreme north and on the more rugged slopes.

In eastern Europe the light rains fall mostly during the summer, so that crops grow well; along the southern coasts, where the summers are dry, irrigation is extensively practiced; and many of the steep hillsides in all regions are terraced and planted. Thus more than twice as much land is cultivated as in the United States, and much larger quantities of

food crops are raised. There are so many people to be fed, however, that in most of the countries the crops are insufficient and much food must be imported.

The great agricultural regions are (1) the northern lowland from the Atlantic eastward through southern Russia, and (2) the broad fertile valleys of the Danube, the Po, the Rhone, and the streams of the Spanish peninsula. The northern region, including the plains of Hungary, yields three fourths of the rye, oats, wheat, barley, and potatoes, and is the chief food-producing belt. Other crops of this belt are beets, beans, cabbages, and the fibers flax and hemp. In southern Europe large quantities of beans, garlic, and other vegetables are raised, and much grain, including corn and some rice, but the characteristic crop is the grape, for this is the world's greatest wine- and raisin-producing region. Other important crops of southern Europe are olives, oranges, lemons, figs, almonds, and chestnuts. Mulberry trees are also cultivated to afford food for silk worms, which are extensively reared.

Herding. There are four times as many sheep raised in Europe as in the United States, twice as many cattle,

and about as many hogs; but in proportion to the population herding is not so important an industry as it is in our country. Only two of the countries of Europe produce more meat than the people consume, and several have to import large quantities.

The great cattle and sheep pastures and dairy farms are mostly in the northern food belt, but some cattle and very many sheep and goats are pastured in the highland regions. Hogs are raised mostly in the forests, where they fatten on acorns, beechnuts, and other mast.

Fishing. The long coast line of Europe invites many people to engage in this industry, and the product is more than twice as great as in the United States.

The most valuable fisheries are those of the northwest coast, which yield great quantities of herring, cod, mackerel, and oysters. The southwestern coast waters afford sardines, anchovies, and tunny fish, while the seas and rivers in the southeast yield great quantities of sturgeon, from the roe of which caviare is made.

The richest coral fisheries of the world are along the shores of the mainland and of the islands in the western half of the Mediterranean; and the best and most extensive sponge fisheries are in the eastern half of this sea.

Lumbering. The forests of Europe, though nearly twice as extensive as those of the United States, yield less than half as much lumber.

The chief lumber regions are northern Russia, the Scandinavian peninsula, and the wooded slopes of the Carpathian Mountains, but most of the highland regions in southern Europe are well wooded.

In nearly all the countries the forests belong to the government and to a few of the noble families, and are carefully preserved from destruction. Only a certain amount of timber may be cut each year, and young trees are planted to replace those that are cut down. The dead timber, windfalls, and fagots are gathered for fuel, and thus, especially in western Europe, many of these cultivated forests have come to resemble great open groves, without underbrush and with the trees planted in rows. It is only in the Balkan plateau that the forests are being destroyed by indiscriminate cutting as in the United States.





in the army or navy, besides drilling every year during a much longer period, and while thus engaged he earns nothing at his regular trade.

Supplemental Work. Make illustrations showing what part of the people of Europe practice agriculture; how the amount of cultivated land in Europe compares with that in the United States; how the cattle of the two compare; the fishing product; the extent of forests, and lumber product; the mineral output; the number of manufacturing hands, and the amount of the product; the commerce, shipping, and railroads; the population, wealth and average earnings.

CENTRAL EUROPE.

UNITED KINGDOM OF GREAT BRITAIN AND IRELAND. This kingdom includes all the British Isles. By what waters are these isles surrounded? Name the largest island; the next in size. By what waters are these islands separated? Name three small groups off the north coast of Great Britain; one group off the south coast.

Name three great indentations of the east coast of Great Britain; four of the west coast; three on the west coast of Ireland. In what part of the British Isles are there highlands? Name the chief ranges. How do these highlands compare in height with the Appalachian Mountains? The hills of Ireland occur near the coast. The low interior plain contains many swamps or bogs. The Shetland Islands and the Hebrides are high and rocky. The Orkneys are low and fertile.

Why is the climate of these islands milder and moister than that of the eastern coast of America in the same latitude? The climate of Ireland is especially mild and moist. Why?

What three countries are included in the island of Great Britain? Describe the surface of each. Name four rivers of England; two of Scotland; three of Ireland.

Which of the United States is about as large as England? Which is about the size of Ireland? Which is about the size of Scotland? How does the population of each of these states compare with that of the part of the British Isles which it about equals in size? The British Isles as a whole are densely peopled, and England is one of the most densely peopled countries in the world.

Most of the land in the British Isles is owned by a comparatively few rich families of nobles, and but one fourth of it is under crops. A much larger proportion is used for pasturage, and cattle and sheep raising are important industries. Great Britain producing more mutton and wool than any other country in Europe except Russia. Grain, hay, vegetables, some fruits, and much dairy products and meat are produced, but only a small part of the people are engaged in agricultural and pastoral pursuits, and some food of all kinds has to be imported in large quantities.

More than half of the working population is engaged in manufacturing, and a large part of the remainder in commerce and mining, all these industries being most active in England. In the value of her manufactures Great Britain

exceeds all other countries except the United States and in the making of cotton and woolen cloth she greatly exceeds all other countries in the world. The coal and iron mines of the British Isles are chiefly in northern and southwestern England and in southern Wales. The coal fields, though much smaller than those of the United States yield about as much coal, while the iron and steel manufactures exceed those of any other country except the

What two chains are in the northern part of the plateau of Mongolia? What chain forms its eastern border? What is this chain called north of the Amur River? These chains are lower than those nearer the Pamir plateau, but the snow-clad peaks of the Altai range are three miles high.

What three chains form the northern border of the highland west of Pamir plateau? The Hindu Kush is a snow-capped range about four miles high. The other chains are lower, but they contain lofty peaks, and the upper valleys of the Caucasus are filled with glaciers. What chains border the plateau of Iran on the east and on the southwest?

What plateaus and ranges compose the Eurasian highland in southern Europe? Of these the Alps and the Pyrenees are snow-clad, and have peaks between two and three miles high.

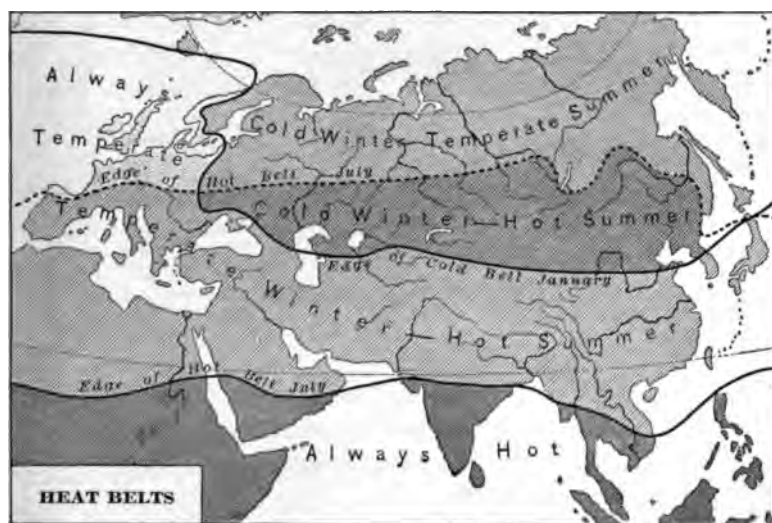
What two mountain ranges are in the great northern lowland? These ranges are scarcely a mile high. The Urals are a gradual swell in the great plain. The Kiolen Mountains slope gradually to the east, but their abrupt western slope forms the bold, rocky coast of the Scandinavian peninsula. Great glaciers descend from them to the sea.

What plateau occupies the peninsula of India? It is composed of old outflows of lava like those of the Columbia plateaus.

Earthquakes are not uncommon throughout the Eurasian highland, and they indicate that its upheaval may still be in progress. There are many old volcanic rocks in the highland region, but comparatively few active volcanoes on the mainland of Eurasia, and these are widely separated — one is on the Italian peninsula, two or three near the Caspian Sea, one or two northeast of the Pamir plateau, and several on the peninsula of Kamchatka. About 150 active volcanoes, however, occur on the long chain of mountainous islands which rise from the submerged edge of the continental plateau east and southeast of Asia. This region is the greatest center of volcanic activity in the world. It is shaken by earthquakes almost constantly. Probably no other part of the continental plateau is being upheaved so rapidly.

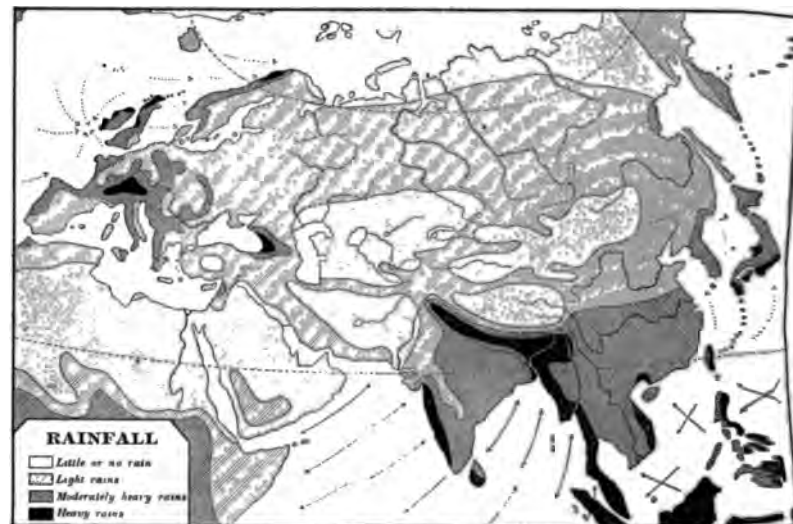
The Lowlands. Most of the great northern lowland has an elevation of less than 500 feet, and in places it is actually below sea level. Find such a place. In general its flat surface is broken only by the low bluffs which border the broad flood plains of the streams.

The detached lowland plains to the east and south of the great highlands are composed of alluvium washed from the bordering mountains, and their upheaval is thought to have been comparatively recent.



Climate. Review the lesson on the heat belts (pp. 24, 25). In what five heat belts does Eurasia lie? What part of Eurasia lies in each heat belt? To which other grand division is Eurasia similar in the general distribution of its heat belts? Review the lessons on winds and rainfall (pp. 26, 27). Where are the largest regions of heavy or moderately heavy rainfall in Eurasia? Where are the regions of light rains or no

rain? What is peculiar about the winds of southern and southeastern Asia? (p. 26.) What effect have these winds and the highlands upon the rainfall of this region; upon the rainfall of central and southwestern Asia? What are the causes of the moderately heavy and the light rainfall in western and northern Eurasia?



Because of the greater extent of Eurasia the extremes of temperature in the interior are greater than in North America. Why? The coldest winters in the world occur in northeastern, and nearly the hottest summers in southwestern Asia. Thus, with the exception of the southern and the western parts, Eurasia is characterized by excessive temperature changes during the year. Even in the hot belt there is a chilly season when the dry winds blow southward from the highlands. The summer heat and the winter cold in the west are tempered by the prevailing winds from the Atlantic.

In the south and southeast the monsoon winds (p. 26) blowing from the sea in summer yield copious rainfall — all on the seaward slopes, while little rain falls at other seasons, when the winds blow seaward. The sea winds lose most of their moisture on the seaward slopes of the ranges bordering the great highlands, so that the plateaus and lowlands behind these ranges receive little or no rain and are therefore deserts. The westerly winds, with their cyclonic storms, yield ample rainfall at nearly all seasons over western and central Europe, but have little moisture left when they reach northern Asia.

Drainage. Beginning in the Khyngan Mountains trace a continuous line around a great central region of Eurasia whose drainage does not reach the ocean or any of its arms. Locate this region on the rainfall map, and tell why it is a region of "interior drainage." Does any rain fall in this region? Does the rainfall give rise to any stream? What becomes of these streams? (p. 15.) Is the water of these lakes fresh or salt? Why? What is the largest sheet of water in this region? What two large tributaries has it? If the rainfall of Central Asia were sufficiently heavy, part of this great interior basin would be drained to the Pacific, part to the Indian Ocean, and part to the Atlantic Ocean through the Caspian, Black, and Mediterranean seas. What other part of Eurasia sends no drainage to the sea? What three large rivers of Eurasia flow to the Arctic Ocean? What four flow to the Pacific Ocean? Name four that flow to the Indian Ocean. Name three that flow to the Atlantic Ocean, through the Black Sea. Do the Eurasian rivers flowing to the Arctic and those flowing to the Indian Ocean have their sources near together? Why not?



The Alps.

As so large a part of Eurasia receives light or scanty rainfall, none of its streams equals in volume the great rivers of America. On the moist southeast slope the river basins are comparatively small, while the large basins of the north receive only a light rainfall. Thus the Yangtze, which is the longest and largest river of Eurasia, is not much larger than the St. Lawrence in volume, though the four large rivers of the north are but little smaller. In general the streams in the southeast and in the west are much larger in proportion to their length than those in the north and in the southwest. Why?

The Caspian Sea is about five times as large as Lake Superior, and is the largest lake in the world. The evaporation from it is so rapid that its surface lies about eighty-five feet below sea level, though it receives the Ural and the great Volga, a river as large as the Mackenzie. The land barrier which separates the Black Sea from the Caspian, north of the Caucasus, is so low that if the Black Sea were to rise ninety feet it would overflow into the Caspian.

The two large and many small lakes east of the Caspian are all higher than the Caspian Sea, but because of the rapid evaporation none of them can overflow its basin. What large lake is in the Yenisei basin? It is about twice the size of Lake Ontario, and is the largest fresh-water lake in Eurasia. There are very many smaller fresh-water lakes, as well as extensive swamps, on the low, flat surface of the northern plain, particularly near the central part. West of the Urals the surface is covered with the drift of the old Scandinavian glacier (p. 20), and greatly resembles the great Canadian lowland. Name the two largest lakes in this region.

Supplemental Work. Draw circles representing the western and eastern hemispheres, and sketch North and South America, and Eurasia.

Draw on a larger scale a map of Eurasia, naming the chief indentations and peninsulas, the chief mountains and rivers, and indicating the chief divides. Model Eurasia. Write a comparison of the climates of central, southern, and western Eurasia.

VEGETATION AND ANIMALS.

Review the lesson on distribution of life (pp. 28-29). Why do dense forests grow in southeastern Eurasia? What part of Eurasia is covered with vast open forests? What is the rainfall of this region? What part is an open grassy region or a desert? Why? What two great life regions occupy most of Eurasia? (map, p. 29.) What physical features form the barrier between these regions? Why are there broad transitional regions between them in the east and west but not in the center? Review the lessons on the Oriental and Eurasian life regions (p. 31), and mention some of the characteristic plants and animals of each region.

The Arctic coast of Eurasia, like that of America, is bordered by dreary tundras in which mosses and lichens form the principal vegetation. The broad belt of forests south of the tundras is composed chiefly of cone-bearing evergreen trees, such as larches, pines, and firs, but is broken by many great treeless areas and swamps covered with birch and willow thickets. In the southwestern part of this belt are fine forests of oak, beech, and other hardwood trees. Many years ago this forest belt extended westward to the Atlantic, but it has long since been cleared away from the fertile lowlands in that region.

The principal large animals of the forest region are reindeer, elk, and bear, but there are many wolves, and very many small fur-bearing animals, as ermines, martens, sables, squirrels, and foxes.

In the drier region south of the forest belt, both in the lowlands and on the plateaus, are vast grassy prairies, or steppes, which merge into the exceedingly dry and barren deserts. These steppes and deserts form the characteristic feature of central Eurasia from the Mediterranean nearly to the Pacific.

Almost the only forests throughout this whole region grow on the moister sides of the mountain ranges. Oaks, beeches, chestnuts, cedars,



Some animals of Eurasia.

laurels, and myrtles are common trees on the lower and moister slopes, while firs, pines, and other trees yielding resinous gums grow at greater elevations.

This is the true home of the ancestors of the horse, the cow, the camel, the sheep, the goat, and the hog, and great numbers of all these domesticated animals are raised here, while wild animals closely related to them are the most characteristic animals. There are many kinds of wild sheep and goats, antelopes and gazelles, wild boars, camels, asses, and wild oxen, including oxlike, hairy yaks, and hairless buffaloes. There are several kinds of bears among the mountains, while the tiger and the leopard wander northward over the transitional regions as far as to the Amur River in the east and to the southern shores of the Caspian Sea in the west.

The great deserts are almost entirely devoid of surface water for hundreds of miles. In places, however, the ground water comes near enough to the surface to supply the roots of plants. In such a place an oasis of vegetation is formed in the midst of the barren desert. Some oases are many miles in extent and contain springs and running streams, but others are quite small and afford water to the thirsty traveler only by means of shallow wells which have been dug down to the underground supply.

Violent winds at times sweep over the open desert, raising dense clouds of dust and sand, which are carried forward in such immense quantities as nearly to bury any unfortunate travelers overtaken by the storm. Because of such windstorms some parts of almost all deserts are

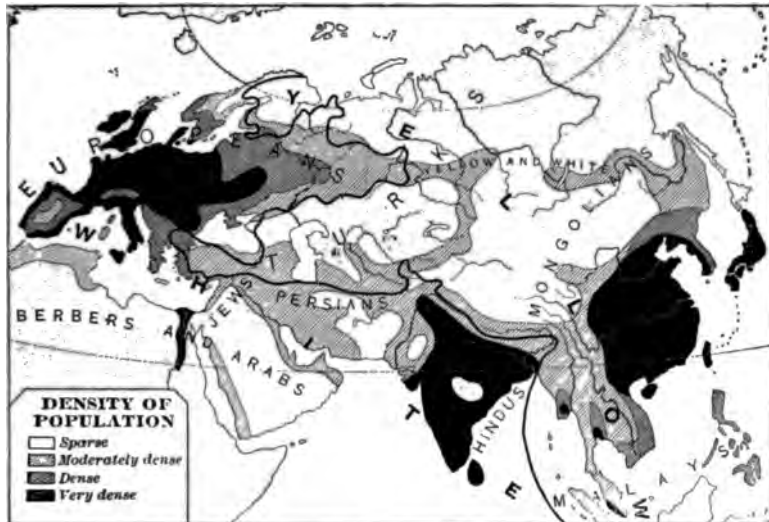
bare and stony, being swept nearly clean of the surface detritus, while other parts are deeply covered with shifting sand dunes.

The dense forests of southeastern Asia have been much reduced by the crowded population, and are now confined to tracts least favorable to cultivation — as marshy low-lands or rough hilly districts. These forests are much denser and more luxuriant than those of the north. In the lowlands are many kinds of palms, bamboos, and trees yielding India rubber, spices, and dyewoods, together with pitcher plants and hundreds of vines growing between the trees, matting them together and forming with the rank undergrowth an impenetrable jungle.

Here the rhinoceros and the wild boar make their homes. Tigers and several kinds of leopards also live in the jungle. These fierce animals wander out into the cultivated lands at night and kill hundreds of people every year, besides thousands of sheep and cattle. Many more people, however, are killed by the bite of the cobra, a venomous snake which abounds in India.

On the higher lands the forests are composed of many fine timber trees, of which the toon, sal, teak, satinwood, and sandalwood are the most valuable. In these forests are found elephants, bears, monkeys, and wild cattle.

Supplemental Work. Make lists of the Eurasian plants and animals which you have seen. Describe one plant and one animal of Eurasia which you have not seen.



MAN.

What is the population of Asia; of Europe? (p. 157.) How does the population of Eurasia compare with that of the whole world; with that of the whole of America? Has Eurasia or North America the denser population? Eurasia is the most densely peopled of all the grand divisions. If the people were evenly distributed over the land surface of the world Eurasia would have but half of its present population. In what parts is the population dense or very dense? Nearly four fifths of the people of Eurasia live in these three regions. Why are northern, central, and southwestern Asia not so well adapted for a dense population? What two races live in Eurasia? In what parts do the whites live chiefly? Locate the homes of five peoples of the white race. What people of the yellow race extends westward between the Europeans and other Aryan peoples? Locate the homes of two other peoples of the yellow race. Review the lesson on man's culture, pp. 34, 35.

By far the greater part of the people in all the thickly settled regions of Eurasia have reached some degree of civilization. It is only in the dense forests of the islands and mainland in the extreme southeast and along the

bleak Arctic shores that a few savage tribes are found. Most of the native tribes in the sparsely settled northern lowland are far advanced through the stage of barbarism.

Unlike America, Eurasia has been the home of civilized man ever since the beginning of history, for it was probably in this grand division that man first became civilized. People were already civilized more than 4000 years ago in the plains of Mesopotamia, India, and China, as well as in the fertile valley of the Nile just west of the Isthmus of Suez. No one has yet been able to tell certainly in which of these localities civilization appeared first. This early civilization, however, was very imperfect, and it improved so slowly that the people of these regions are not yet highly civilized.

More than 3000 years ago civilization reached the Grecian peninsula, and thence it gradually spread through western Eurasia. This western civilization improved so rapidly that the Aryans of Europe became more highly civilized than the other people of Eurasia. As they advanced in civilization their wants became greater, and they sought new and better commercial routes by which their wants might be supplied. In this search their ships sailed completely around the world, and they discovered southern Africa, the unknown continents of America and Australia, and the islands of the sea. They planted colonies in these and other lands, thus carrying their civilization over the globe. This civilization has constantly advanced until now the European Aryans and their descendants in the new lands which they have settled are by far the most enlightened people in the world.

Supplemental Work. Write a comparison of eastern and western Eurasia in density of population, races, and culture of inhabitants.

TOPICS ON EURASIA.

- I. NORTHERN PLAIN. Coast. Surface. Climate. Drainage. Life: vegetable; animal. Man: density; races; civilization.
- II. EASTERN AND SOUTHERN PLAINS. Names. Formation. Climate. Drainage. Life: vegetable; animal. Man: density; races; history; civilization.
- III. EASTERN HIGHLANDS. Plateaus. Mountains. Climate. Life.
- IV. WESTERN HIGHLANDS. Plateaus. Mountains. Climate. Life.
- V. ISLANDS. Western. Eastern. Chief groups. Movement. Climate. Life.

EUROPE.

Before studying the following lesson on People and Countries take the Map Exercise on Europe at the top of page 119.

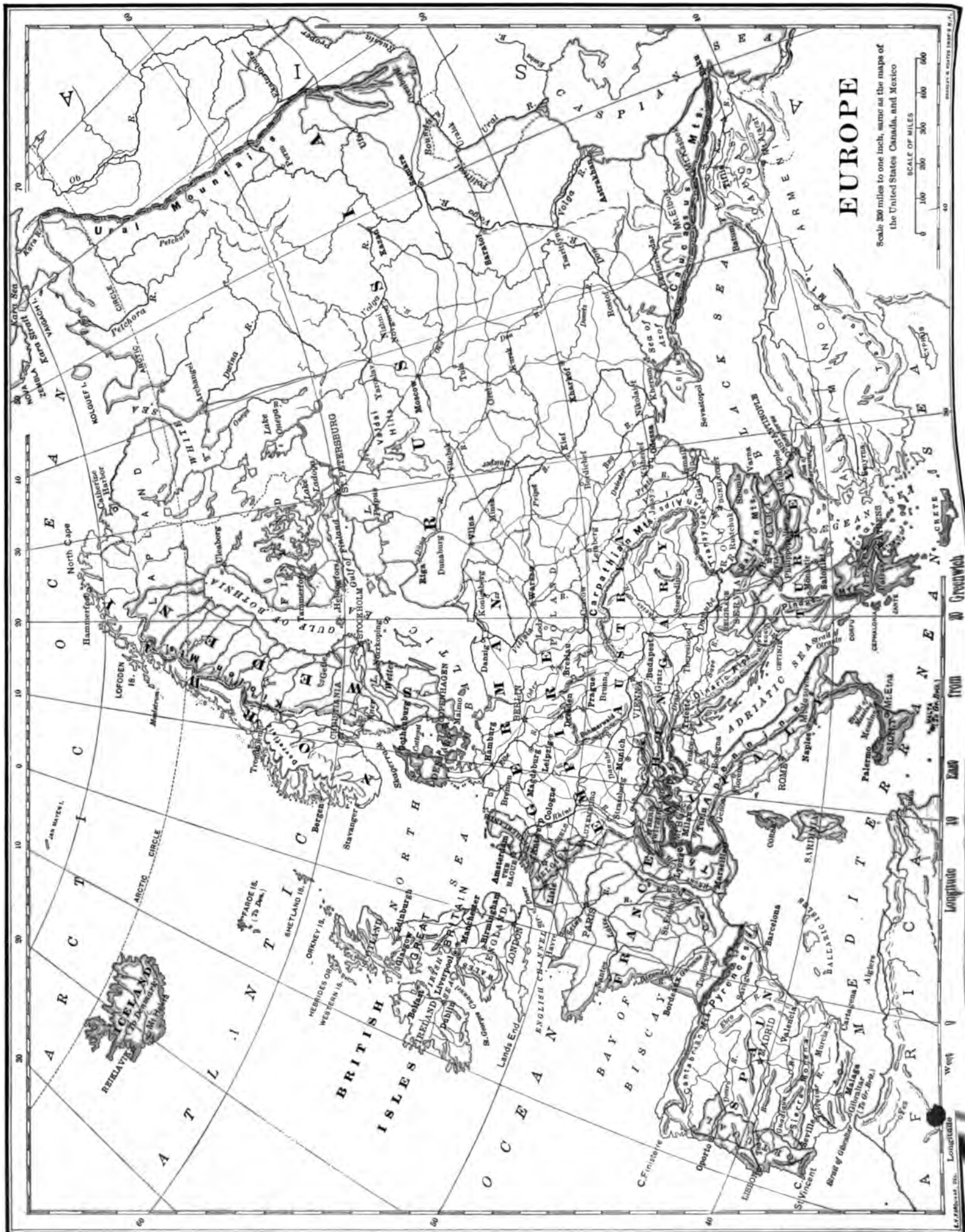
PEOPLE AND COUNTRIES.

People. Europe, though little larger than the United States, contains five times as many inhabitants, and hence is much more densely peopled. In what part is the population dense or very dense? Compare these regions in extent with the corresponding regions in the United States (map, p. 57). Where is the population of Europe sparse?

Countries. Europe is composed of twenty or more independent states or countries, in nearly every one of which people differ from those of the others in language, customs, and standards of living.

This variety in language and customs in neighboring localities is one of the most striking and characteristic differences between the population of Europe and that of the United States. The difference arises





Map Exercise on Europe. The Ural and Caucasus mountains and the Caspian and Black seas are often considered the boundaries between Europe and Asia. What is the most northern point of the European mainland? What point on the American mainland is in about the same latitude? What point on the eastern coast of America is in about the same latitude as the most southern point of the European mainland? How does Europe compare with the United States in size?

From the Ural Mountains trace the divide between the northern and southern slopes of Europe. In what physical division does the eastern half of this divide lie? The western half? Into what arms of the sea is the northern slope drained? Name two rivers that flow into the Baltic Sea; two that flow into the North Sea; one that flows into the Bay of Biscay. Into what seas is the southern slope drained? Trace the divide in Europe of the Caspian basin; of the Black Sea basin. Name the two largest rivers of the Caspian basin; the three largest of the Black Sea basin. What river flows into the Adriatic? What two flow into the western part of the Mediterranean?

Through what part of Europe does the great Eurasian highland extend? What mountains and what plains are in the Danube basin? What mountains form the southern divide of this basin? What mountains extend south into the Grecian peninsula? What mountains traverse the Italian peninsula? What mountains are between the Alps and the Pyrenees? Name two ranges of the Spanish plateau. What mountains are in northwestern Europe? What group of large islands is near the west coast? By what is Great Britain separated from the mainland?

Supplemental Work. Sketch Europe, locating its chief mountains, plateaus, plains, divides, rivers, bays, and islands. Model Europe.

mainly from the different ways in which the two regions were civilized. The United States received civilization through the overrunning and settling of the country, during the last 300 years, by a vast number of



Ancient ruins in Rome.

highly civilized, white foreigners, most of whom used the English language. This foreign population absorbed or drove off the comparatively few native Indians and replaced barbarism with its own old and foreign civilization. Civilization, on the contrary, was itself very young and rude when it first appeared in Europe thousands of years ago, and it spread among the many native tribes so slowly that the barbarous natives themselves gradually became civilized, and then, as the centuries passed, they invented the more modern civilization which was carried to America. As among the American Indians, so among the barbarous tribes of Europe there were many native languages. In the United States the native languages and customs were swept away with the Indians, but in Europe various tribes retained their languages and many of their customs as they gradually advanced in civilization.

The languages and customs of neighboring tribes were often some-

what similar but were quite different from those in distant regions, for few people traveled far from home in those days. It was only when some tribe conquered and settled among another people that distant tribes mixed together. In such cases both of the old languages gradually disappeared, while from their blending a new language came to be used by the descendants of the mixed people.

The states of our Union are merely political subdivisions formed mainly for the convenience of local government—many of them having been marked out on paper with straight and regular boundaries before they were settled by civilized men. Most of the countries of Europe, however, are regions inhabited by people who during ages of occupation and contact have become more closely related to one another in language, customs, and history, than they are to the people of the other countries. Hence the boundaries of European countries are very irregular.

Southwestern Europe. Name five countries of the European mainland which have a seacoast and which lie west of the Rhine and the Adriatic Sea. These are called Latin countries because the languages spoken in them are derived from the Latin language used by the ancient Romans.



A Viking's ship.

The Latins were a people of Italy who early received civilization from the Grecian peninsula. They built Rome, which 2000 years ago was the largest and most magnificent city of the world. They conquered and taught civilization to all the tribes of Europe southwest of the Rhine, and added that region to the great Roman Empire, which extended eastward through southern Europe and far into southwestern Asia.

The Christian religion was brought to Rome by the Apostles shortly after the crucifixion of Jesus Christ, and Rome to this day is the residence of the Pope, the head of the Catholic Church; and this form of religion still prevails in all the Latin countries.

Central Europe. Trace a straight line from southeastern Italy to North Cape. What seven countries lie wholly or mostly between this line and the Latin countries? Most of the languages in this region, as well as the English language, which is used in the British Isles, resemble the old German language, and so these countries are often called Germanic or Teutonic countries.

The old Teutonic tribes remained barbarians long after the Romans had conquered and civilized the Latin countries, for though the Romans often fought the Teutons they could never conquer them, but were at last conquered by them. Then followed the "Dark Ages," during which the barbarians overran the civilized Latin countries, but in doing so learned civilization from the conquered people. Two Teutonic tribes, the Angles and the Saxons, whose home was near the shores of the North Sea, crossed to Great Britain and settled in the southern part, which came to be called Angle-land or England, while the blended language of these settlers became Anglo-Saxon or early English. The tribes of the Scandinavian and Danish peninsulas were fearless sea rovers called Northmen and Vikings. They overran all the coasts of the North Sea

and the English Channel and discovered and settled Iceland and Greenland. They probably even visited New England, 500 years before Columbus reached the West Indies.

The Christian religion was spread throughout central Europe by priests and monks belonging to the Catholic Church, but now the Protestant faith prevails in all the Germanic countries, except Austria, which is still mainly Catholic.

Eastern Europe. What great country occupies most of eastern Europe? What six countries occupy the southeastern part? The eastern part of Europe is called Slavonic Europe because nearly all of the languages used show a blending with the language used by the Slavs, a great tribe that once lived northeast of the Carpathian Mountains.

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In eastern Europe the light rains fall mostly during the summer, so that crops grow well; along the southern coasts, where the summers are dry, irrigation is extensively practiced; and many of the steep hillsides in all regions are terraced and planted. Thus more than twice as much land is cultivated as in the United States, and much larger quantities of

food crops are raised. There are so many people to be fed, however, that in most of the countries the crops are insufficient and much food must be imported.

The great agricultural regions are (1) the northern lowland from the Atlantic eastward through southern Russia, and (2) the broad fertile valleys of the Danube, the Po, the Rhone, and the streams of the Spanish peninsula. The northern region, including the plains of Hungary, yields three fourths of the rye, oats, wheat, barley, and potatoes, and is the chief food-producing belt. Other crops of this belt are beets, beans, cabbages, and the fibers flax and hemp. In southern Europe large quantities of beans, garlic, and other vegetables are raised, and much grain, including corn and some rice, but the characteristic crop is the grape, for this is the world's greatest wine- and raisin-producing region. Other important crops of southern Europe are olives, oranges, lemons, figs, almonds, and chestnuts. Mulberry trees are also cultivated to afford food for silkworms, which are extensively reared.

Herding. There are four times as many sheep raised in Europe as in the United States, twice as many cattle, and about as many hogs; but in proportion to the population herding is not so important an industry as it is in our country. Only two of the countries of Europe produce more meat than the people consume, and several have to import large quantities.

The great cattle and sheep pastures and dairy farms are mostly in the northern food belt, but some cattle and very many sheep and goats are pastured in the highland regions. Hogs are raised mostly in the forests, where they fatten on acorns, beechnuts, and other mast.

Fishing. The long coast line of Europe invites many people to engage in this industry, and the product is more than twice as great as in the United States.

The most valuable fisheries are those of the northwest coast, which yield great quantities of herring, cod, mackerel, and oysters. The southwestern coast waters afford sardines, anchovies, and tunny fish, while the seas and rivers in the southeast yield great quantities of sturgeon, from the roe of which caviare is made.

The richest coral fisheries of the world are along the shores of the mainland and of the islands in the western half of the Mediterranean; and the best and most extensive sponge fisheries are in the eastern half of this sea.

Lumbering. The forests of Europe, though nearly twice as extensive as those of the United States, yield less than half as much lumber.

The chief lumber regions are northern Russia, the Scandinavian peninsula, and the wooded slopes of the Carpathian Mountains, but most of the highland regions in southern Europe are well wooded.

In nearly all the countries the forests belong to the government and to a few of the noble families, and are carefully preserved from destruction. Only a certain amount of timber may be cut each year, and young trees are planted to replace those that are cut down. The dead timber, windfalls, and fagots are gathered for fuel, and thus, especially in western Europe, many of these cultivated forests have come to resemble great open groves, without underbrush and with the trees planted in rows. It is only in the Balkan plateau that the forests are being destroyed by indiscriminate cutting as in the United States.





in the army or navy, besides drilling every year during a much longer period, and while thus engaged he earns nothing at his regular trade.

Supplemental Work. Make illustrations showing what part of the people of Europe practice agriculture; how the amount of cultivated land in Europe compares with that in the United States; how the cattle of the two compare; the fishing product; the extent of forests, and lumber product; the mineral output; the number of manufacturing hands, and the amount of the product; the commerce, shipping, and railroads; the population, wealth and average earnings.

CENTRAL EUROPE.

UNITED KINGDOM OF GREAT BRITAIN AND IRELAND. This kingdom includes all the British Isles. By what waters are these isles surrounded? Name the largest island; the next in size. By what waters are these islands separated? Name three small groups off the north coast of Great Britain; one group off the south coast.

Name three great indentations of the east coast of Great Britain; four of the west coast; the bay on the west coast of Ireland. In what part of British Isles are there highlands? Name the chief ranges. How do these highlands compare in height with the Appalachian Mountains? The hills of Ireland occur near the coast. The low interior plain contains many swamps or bogs. The Shetland Islands and the Hebrides are high and rocky. The Orkneys are low and fertile.

Why is the climate of these islands milder and moister than that of the eastern coast of America in the same latitude? The climate of Ireland is especially mild and moist. Why?

What three countries are included in the islands of Great Britain? Describe the surface of each. Name four rivers of England; two of Scotland; three of Ireland.

Which of the United States is about as large as England? Which is about the size of Ireland? Which is about the size of Scotland? How does the population of each of these states compare with that of the part of the British Isles which is about equals in size? The British Isles as a whole are densely peopled, and England is one of the most densely peopled countries in the world.

Most of the land in the British Isles is owned by a comparatively few rich families of nobles, and but one fourth of it is under crops. A much larger proportion is used for pasturage, and cattle and sheep raising are important industries. Great Britain producing more mutton and wool than any other country in Europe except Russia. Grain, hay, vegetables, some fruits, and much dairy products and meat are produced, but only a small part of the people are engaged in agricultural and pastoral pursuits, and food of all kinds has to be imported in large quantities.

More than half of the working population is engaged in manufacturing, and a large part of the remainder in commerce and mining, all these industries being most active in England. In the value of her manufactures Great Britain

exceeds all other countries except the United States and in the making of cotton and woollen cloth she greatly exceeds all other countries in the world. The coal and iron mines of the British Isles are chiefly in northern and southwestern England and in southern Wales. The coal fields, though much smaller than those of the United States, yield about as much coal, while the iron and steel manufactures exceed those of any other country except the

factures; and *Birmingham* and *Sheffield*, noted for machinery, cutlery, and hardware. *Hull* is the important seaport



Edinburgh Castle.

for the trade of this region with the European mainland. *Newcastle*, on the Tyne, and *Cardiff* are great shipbuilding and iron-manufacturing centers and coal-exporting points. *Edinburgh*, the seat of the local government of Scotland, and *Dublin*, of Ireland, are important cities, and *Belfast* is the center of the Irish linen manufacture.

THE GERMAN EMPIRE. What seas and countries border the German Empire? (p. 127.) Describe its surface. Name five rivers of its northern slope; one of its southern slope. Locate its chief mountains. Compare it with the British Isles in area and population (p. 157); with Texas. What part of the United States is in the same latitude?

The southern half of the German Empire lies on the Alpine plateau, from which rise several groups of low and much worn volcanic mountains. The sandy lowlands of the north are covered with the drift of the old Scandinavian glacier.

The Rhine is the great river of Germany. It has cut through the plateau a narrow, picturesque valley, whose steep side slopes are terraced for vineyards and are crowned with the ruins of old castles. In its lower course the river has deposited a broad flood plain, which is covered with meadows and fertile fields.

About nine tenths of all the land in Germany is productive. Large areas are devoted to the cultivation of grain, and the sandy soil in other places yields an abundance of potatoes and sugar beets. Much of the southern highland is covered with forests, which are an important source of revenue, and the river valleys are noted for their vineyards. Rye is the grain most grown, and the commonest food of the people is a dark rye bread.

Among European countries, Germany ranks next to Great Britain in the production of coal and iron ore; and it exceeds all other countries in the world in the production of zinc. Copper, lead, silver, sand for glass, clay for porcelain, and salt are also obtained.

Like England, Germany is a great manufacturing nation. More food products are manufactured than in any

other country except the United States, chiefly liquors and beet sugar. Most of the sugar used in Europe is made in Germany. The manufacture of woollens, cottons, silks, and linens ranks next in importance.

Iron and steel and all kinds of hardware are extensively made, especially in the west, and porcelain and wooden articles are also important manufactures.

Commerce is very active. There are more railroads in Germany than in any other country except the United States. Nearly all the rivers are navigable and are connected by canals. Even the Danube is thus connected with the Rhine, through the river Main. There is also a great ship canal through the isthmus of the Danish peninsula, connecting the Baltic Sea and the North Sea.

The German soldiers are said to be the finest in Europe. Every man must serve in the army at least a year, and this period of service may be much extended. The Germans are also celebrated for their learning.

The German Empire consists of twenty-two separate states, the free towns of Lubeck, Bremen, and Hamburg, and the territory of Alsace-Lorraine. The largest of the states is Prussia, which includes

more than half of the entire population. The King of Prussia is also the Emperor, or *Kaiser*, of Germany. He is the chief executive. The laws are made by an imperial parliament, consisting of a *Bundesrath* composed of members appointed by the local governments of the various states, and a *Reichstag* composed of representatives elected by the people.

Many thousand Germans have settled in the United States, and German merchants are found in nearly all newly settled countries. The foreign dependencies of Germany comprise extensive regions in Africa, possessions in Oceania, and a settlement in China.

The small *Grand Duchy of Luxemburg*, between Germany and Belgium, is declared by treaty between the Great Powers to be neutral or independent, but commercially it is very closely united with Germany.



Jaunting car, Dublin.



A castle on the Rhine.



Fishing boats, Norway.

Sweden slopes gradually to the east, and is covered with glacial drift. It abounds in lakes and waterfalls, like New England. Why? (p. 50.)

Fishing and lumbering are the most important industries in Norway; and agriculture, dairying, lumbering, and the mining of iron ore in Sweden. The leading manufactures are wooden ware, hardware, and fish oil.

Most of the trade of these countries is with Great Britain and Germany. Their commercial fleet is large, but much of its work consists in carrying goods between other countries.

Norway and Sweden are under the same king, but each country has its own parliament.

The Norwegians, Swedes, and Danes are closely related, and are called Scandinavians. Their languages are much alike. In the north are many Lapps and Finns who belong to the Turkish branch of the yellow race.

Norway and Sweden are the most sparsely settled countries of Europe, and yet the population is about as dense as in the southeastern United States. Many of the farmers in the upper Mississippi valley are natives of the Scandinavian countries.

Name and locate the capital of each country. *Stockholm*, about the size of Buffalo, is the largest city on the peninsula, and is a center of iron manufacture. *Gothenburg* and *Christiania* have cotton and woolen factories and lumber mills. *Bergen* is the center of a great fish trade.

THE EMPIRE OF AUSTRIA-HUNGARY. Bound Austria-Hungary. Name its mountain ranges. What river valley occupies its central part? Through what part of the country does the European divide pass? On what waters does the only seacoast of the country border?

Mountain ranges surround and cross Austria-Hungary, and nearly inclose the low, fertile plains of Hungary. The Danube enters and leaves these plains through gaps which it has cut in the mountains.

The chief occupation is agriculture, and grain, flax, and hemp, as well as olives and grapes, are raised. This is the only European country which has a surplus for export of all the great food products—grain, meat, dairy products,

and wine. The rearing of silkworms is an important industry in the warmer parts of the country, and the cutting of lumber in the east, while in the north much iron, coal, silver, and rock salt are mined. In the northwest is a busy manufacturing region, in which cloth, iron and steel goods, fine Bohemian glass, wooden ware, and pianos are made. Much weaving and spinning by hand are also done in all parts of the country, and much wine is made, especially in Hungary.

With its short seacoast, separated by mountain ranges

from the rest of the country, Austria-Hungary has comparatively little shipping or sea-borne commerce, but it has a large overland trade with surrounding countries, and especially with Germany, by railroad and by the Danube and its canal connections with the Rhine.

In the eastern half of the country the population and language are mostly Slavonic, though there are also many people of the yellow race.



Parliament building, Vienna.

Austria-Hungary consists of several provinces formerly separate, but now united as the two states of Austria and Hungary under one monarch. Each state has its own constitution and its own parliament, and sends delegates to a general parliament by which affairs of common interest are controlled.

The little *Principality of Liechtenstein*, between Austria and Switzerland, is practically a part of Austria-Hungary.

Vienna is a brilliant and beautiful capital, and the fourth city of Europe in size. It is a great educational center. *Budapest*, the capital of Hungary, is an important grain market and milling center. *Prague* is in the manufacturing region. *Trieste* is the chief seaport.

THE REPUBLIC OF SWITZERLAND. By what countries is Switzerland surrounded? Describe its surface. Name the two largest lakes in the Alpine plateau. What four great rivers receive drainage from Switzerland?

Switzerland is much visited by tourists in summer, because of its high snow-covered mountains, its great glaciers, which creep down into the green valleys, its glacial lakes, and its beautiful waterfalls.

The land is utilized to the snow limit, largely for pastures, and cattle raising is a leading industry. While some grapes, grain, and vegetables are raised, much of the food is imported, except dairy products—of these there is a large surplus for export, chiefly in the form of cheese and condensed milk.

Switzerland is an active manufacturing region, though most of the articles are handmade. Almost every house is a miniature factory. Textiles, embroideries, plaited straw, watches and clocks, and carved wood are among the manufactured products.

Railroad routes follow the Rhine, Rhone, and Inn valleys. To what country does each of these routes give access? The longest railroad tunnel in the world has been made under the St. Gotthard pass into Italy.

The Swiss people are of mixed descent. German language and customs prevail in the north, French in the west, and Italian in the south.

Zurich, the largest city, is a bustling manufacturing town, producing chiefly leather and silk goods. *Geneva* is noted for watchmaking. *Basel* manufactures silk ribbons. *Bern* is the capital and chief railroad center.

Supplemental Work. Find out about William E. Gladstone; Prince Bismarck; Prince Metternich; Gustavus Adolphus; William the Silent; Thorwaldsen; Hans Christian Andersen. Read one of the following: "Story of the English," by H. A. Guerber; "Tom Brown's School Days," by Hughes; "David Copperfield," by Dickens; "Tales of a Grandfather," by Scott; "Kidnapped," by R. L. Stevenson; "Adventures in Thule," by Black; "Orange and Green," by G. A. Henty; "Irish Idylls," by Jane Barlow; "With Frederick the Great," by Henty; "Our Young Folks in Norway," by A. M. Kellogg; "The Lion of the North," by Henty; "Hans Brinker," by M. M. Dodge; "Three Vassar Girls in Switzerland" and "Three Vassar Girls in the Tyrol," by Champney; "Wonder Stories of Travel," by E. McCormick, and Longfellow's "Poems of Places." Begin a scrapbook of clippings and pictures about Europe, especially in its relations to the United States.



Alps, Switzerland.

SOUTHWESTERN EUROPE.

THE KINGDOM OF BELGIUM. By what countries and sea is Belgium bordered? (pp. 131, 118.) Compare it in area and population with the other countries of Europe; with Massachusetts.

Belgium is the most densely populated country of Europe. The greater part is a low, fertile plain, much like Holland. Agriculture is here the chief occupation. Rye, wheat, flax, beets, and beans are raised, yet nearly half the food must be imported.

In the south the land is poor, hilly, and forest-covered, but contains rich mines of coal and iron, and here manufacturing is the leading industry. Belgium is famous for the manufacture of iron and steel and hardware. Woven goods—carpets, woollens, linens, and lace—are also made.

In the north the people are Germanic and speak Flemish, a language much like the Dutch. In the south the people are like the French in race, language, and customs.

Brussels is a fine city, noted for the manufacture of lace, carpets, linens, ribbons, and embroideries. *Antwerp* is one of the

chief seaports of continental Europe. *Ghent* is the chief seat of cotton weaving and leather manufacturing in Belgium. *Liege*, in the iron and coal region, is noted for the making of firearms.

THE REPUBLIC OF FRANCE. Bound France. Describe its surface, naming the mountains (p. 131). Trace through it the main European divide. What four rivers are on the northwestern slope? What river is on the southeastern? From the mouth of the Rhone trace a route by river and canal to Bordeaux on the Garonne; to Nantes on the Loire; to Havre on the Seine; to Strassburg on the Rhine. What large island is part of France? From p. 157, compare France in size and population with the largest state in our Union. How does France compare with other European countries in density of population?



Palace of Justice, Brussels.

France is about twice as large as the British Isles, and is a much more important agricultural country. On the prairie lands of northern France more wheat is raised than in any other country of Europe, except Russia, and almost three fourths as much as in the United States. Great crops of sugar beets, potatoes, and other vegetables

are also cultivated, and thousands of cattle and sheep are raised. The grape is a leading product of central and southern France. In the south, olives also are grown, as well as very many mulberry trees—for rearing silkworms is an important industry. In spite of its great agricultural industries, France is obliged to import both grain and meat, though there is a surplus of dairy products and wine for export.

There are several small coal fields in the east and north, and some iron mines in the same region, but mining is not nearly so important in France as in either Great Britain or Germany.

Next to the British, the French are the chief cloth makers of Europe, and they are the foremost manufacturers of silks and velvets. They also make about one



French peasants.

The colonial possessions of Portugal are more extensive, and include the Azores (p. 155), Madeira, and Cape Verde Islands in the Atlantic, large parts of both the east and the west coasts of Africa, and small tracts of coast in southeastern Asia.

Where is *Madrid*? Although on the dry and barren plateau, it is about as populous as St. Louis, and is the great railroad center and largest city of the peninsula. *Barcelona* is the chief manufacturing center and the chief seaport of Spain. *Valencia* manufactures silk and velvet and exports fruits, oil, and wine produced in the fertile region behind it. *Seville*, at the head of tide water on the Guadalquivir, is a busy port, and has manufactories of silk and of iron. *Malaga* exports grapes, wine, and raisins.

Lisbon, the capital of Portugal, is the second city of the peninsula in size, and has one of the best harbors in the world. Where is *Oporto*? It is a great shipping point for wine. The name "port" wine is a contraction of the name of this city.

THE KINGDOM OF ITALY. What countries and waters border Italy? What mountains border or traverse it? What river basin is in the north? These lowlands are often called the plains of Lombardy. The great islands Sicily and Sardinia and several smaller neighboring islands form part of Italy. Find Mount Vesuvius, on the peninsula. It is the only active volcano on the mainland of Europe. But Mount Etna, in Sicily, Stromboli, and Vulcano, one of the Lipari Islands, are also active volcanoes. How does Italy rank among the countries of Europe in density of population? How does it compare with the United States in this particular? Because it is sheltered by the Alps from north and northwest winds, Italy has an exceptionally warm climate for its latitude. The rainfall is abundant in the fall and winter, but the summers, especially in the south, are quite dry.

A large part of the land is cultivated by the aid of irrigation, and half the people are engaged in agriculture. Much wheat and corn are grown, and in the Po valley some rice, but grain must also be imported. Vineyards



Macaroni and fruit stand, Naples.



Part of Venice.

are numerous and extensive, and thousands of mulberry trees are cultivated, for Italy is one of the greatest wine- and silk-producing countries in the world. On the slopes of the Apennines are chestnut and olive trees, and figs, lemons, oranges, and citrons are largely raised.

Wonderful crops of grass and other forage are produced in the Po valley, and so many cattle are raised that there is a surplus of meat for export. The fisheries afford an important part of the food supply.

The most important mineral product of Italy is sulphur, from the sides of the volcano Mount Etna, but excellent iron ore is mined on the island of Elba, and fine marble is quarried on the mainland. Much fine coral is obtained from the coast waters.

More than one fourth of the people of Italy are engaged in manufacturing, chiefly by hand, and mainly in the reeling of raw silk from the cocoons, though much silk is also spun and woven on hand looms. Other important industries are the making of wine, macaroni, glass, and mosaics, and the cutting of coral and shells for jewelry.

Italy has some sea-borne foreign commerce, but most of the foreign trade is carried on by railroad through the Mont Cenis and St. Gotthard tunnels. The chief exports are raw silk, wine, olive oil, and sulphur.

Italy has colonial possessions in East Africa, but is not a great colonizing country. Many Italians emigrate; some come to the United States, but most of them go to the South American republics of Argentina and Brazil (pp. 108, 109).

San Marino is a small independent republic in eastern Italy.

Where is *Rome*? It is the capital, and, because of its ancient greatness, the most famous of the Italian cities, though it ranks second in population. Among its noted buildings are the Pope's palace, called the Vatican, with its magnificent collection of paintings and statuary; St. Peter's, the largest church in the world; and many famous ruins.

Naples, the largest city of Italy, is somewhat larger than Boston. It is the commercial center of the kingdom, and one of the most crowded cities of Europe. *Milan* and *Turin* are beautiful cities, and the commercial and manufacturing centers of northern Italy. Where is *Paler- mo*? *Genoa*? *Venice*? These are all important sea-ports. Genoa is famous as the birthplace of Columbus. Venice is built on a number of small islands, and its main thoroughfares are canals instead of streets. *Florence* is noted for its art treasures and its romantic history.

Supplemental Work. Find out about Napoleon Bonaparte; Ferdinand and Isabella; Garibaldi. Find who are the present rulers in the countries of Europe. Read "A Tale of Two Cities," by Dickens; "Young Franc-tireurs," by Henty; "A Child's History of Spain," by J. Bonner; "A Vagabond in Spain," by C. B. Luffmann; "Held Fast for England," by Henty; "The Improvisatore," by Andersen; "The Lion of St. Mark's," by Henty; "Stories of Other Lands," by John G. St. John.

EASTERN EUROPE.

THE KINGDOM OF GREECE. By what country and waters is Greece bordered? (p. 118.) What can you say of its coast line? The kingdom includes some islands on the west coast, and the Grecian or Ægean Archipelago to the east. Name and locate the capital.

Like Switzerland, Greece is divided by mountains into many small valleys. Its few rivers are rapid mountain streams, of little use for inland trade, but its deeply indented coast affords good harbors. The land is owned largely by the peasants themselves, but there is little skill employed in its cultivation. The products are similar to those of Italy. Dried grapes, of a peculiar kind known as *currants*, form the principal article of export. The Greeks have always been famous sailors. Much of the commerce of the Black and Mediterranean seas is conducted by them, and shipbuilding is quite an important industry. Most of the fine sponges of commerce are gathered from the eastern part of the Mediterranean Sea, and cured by Greeks.

Greece was the home of art and literature, of commerce and good government, long before the rise of Rome. But the country was despoiled by the Romans and then by the Teutons, and from the middle of the fifteenth century until after the beginning of the nineteenth, it was ruled by the Turks. Under the dominion of these foreign peoples Greece has been sadly reduced in both wealth and culture.

Athens is a growing commercial city and contains relics of former splendor, among them the ruins of the Parthenon, a famous ancient temple.

THE EMPIRE OF TURKEY. By what countries and waters is European Turkey bordered? (p. 118.) This is but part of the Turkish Empire, which extends over southwest Asia and part of northern Africa, and claims Egypt, Bulgaria, Crete, and other states as tributary. Name the capital. The entrance to what sea is controlled by Turkey? Through what straits and what sea is this entrance?

Turkey receives its name from the Turks, a people of the yellow race, who, about five hundred years ago, extended their Asiatic empire over a large part of southeastern Europe. Their European territory has been gradually reduced until it is not now so large as the state of Missouri.

It contains nearly twice as many people as Missouri, however, and the population is very mixed, consisting of Turks, Greeks, Slavs, Gypsies,



Ruins in Athens.



Constantinople.

and many Asiatics. The emperor, called the *sultan*, is an absolute monarch. The officers of the government are often dishonest and cruel in collecting the heavy taxes.

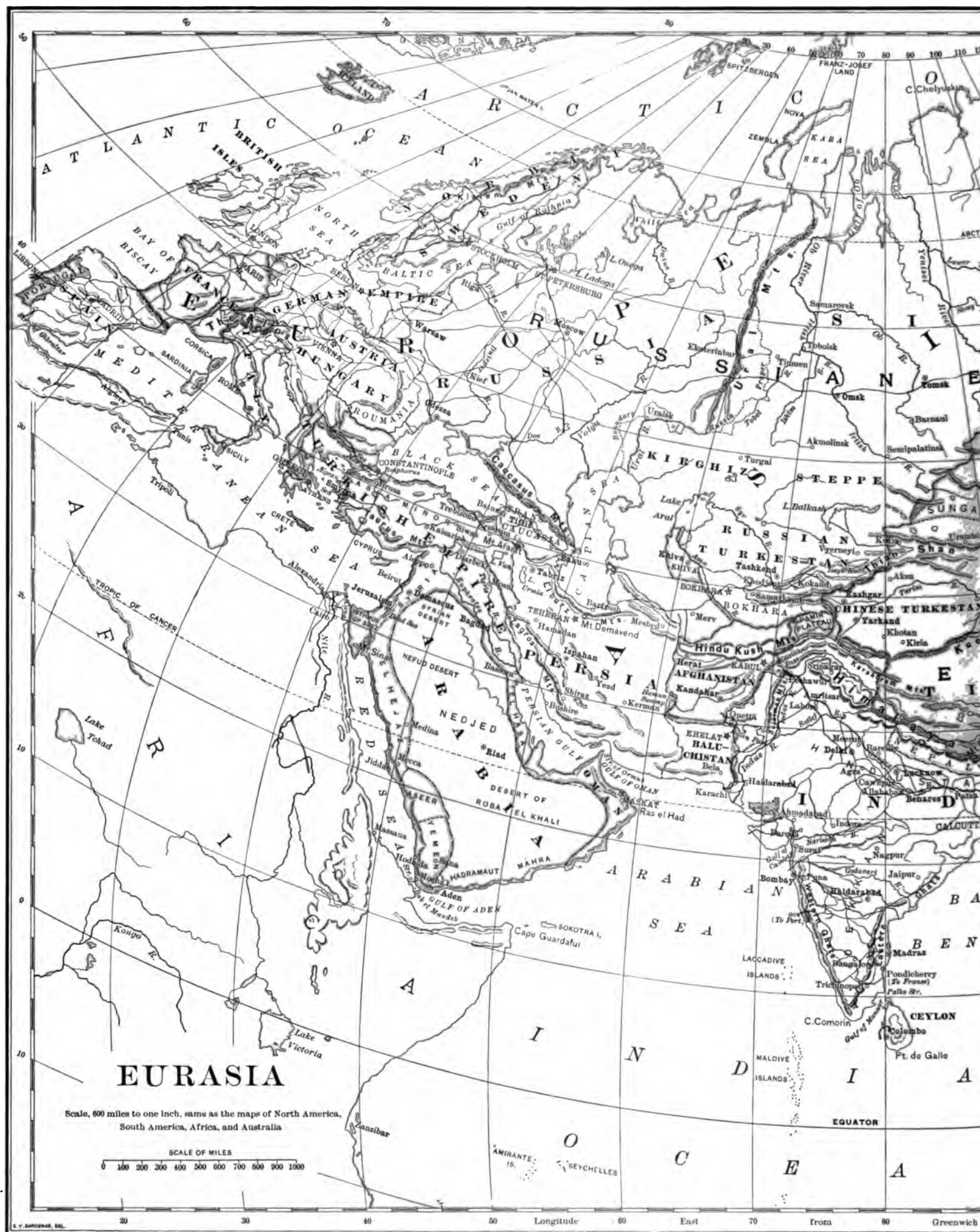
In Turkey more land is devoted to pasture than to farming, and the agricultural methods and implements are very rude. Grain, tobacco, cotton, grapes, and tropical fruits are grown. Manufactures are few. Carpets, cloth, and jewelry are made by hand. The trade is conducted mainly by Greeks, Jews, and foreigners. Raw materials, wine, and food are exported in exchange for manufactured goods. There are few railroads in the country, and roads are bad, so that domestic trade does not flourish.

Where is *Constantinople*? The location of this city is so commanding that it is considered a key to the military control of eastern Europe. It is almost twice as large as Boston, and is noted for its beautiful mosques, or Moham-
medan churches, but most of the streets are unpaved and filthy. *Saloniki* is an important port, with a large Jewish population.

THE MINOR BALKAN STATES. Name the four states between Turkey and Austria (p. 118). All these states formerly belonged to Turkey, but became independent in 1878. Which of them lie in the Danube basin? Which border on the Black Sea? Which borders on the Adriatic Sea? Which has no seacoast? By what mountains is each bordered or crossed?

In the *Kingdom of Roumania* and the *Principality of Bulgaria* agriculture is the leading occupation, and both countries export wheat, corn, and wine, and raise cattle and sheep. The imports are manufactured goods, chiefly from Austria. Roumania is so named because it was settled by the ancient Romans. Bulgaria was settled by people of the Turkish type of the yellow race. Both countries have been so overrun by Slavs, however, that there is little trace of the early settlers. What is the capital of Roumania; of Bulgaria? Bulgaria and Crete, though nominally tributary to Turkey, are practically independent.

The *Kingdom of Serbia* and the *Principality of Montenegro* are less advanced in industry than Bulgaria and Roumania. Both are mountainous, forest-covered countries. Hogs fatten in the forests, and grain and wine are produced. What is the capital of Serbia; of Montenegro?



ASIA.



Review of Physical Features and Life. (pp. 113-117.) What physical features are often considered boundaries separating Eurasia into the two grand divisions of Europe and Asia? How do these divisions compare in size? Name the oceans and ocean arms which border the northern, eastern, and southern coasts of Asia. Locate five peninsulas of Asia, and name the waters they separate. What three island groups are off the east coast? Name three great rivers of the Arctic slope; four of the Pacific slope; four of the Indian Ocean slope. Is the interior region between the basins of these rivers entirely highland? Explain the relation between the rainfall and the drainage of this interior region. Describe briefly the great highland of Asia, its extent, altitude, mountain ranges, climate, and surface peculiarities. Describe briefly the great northern lowland; the Pacific slope; the Indian Ocean slope.

Locate and describe briefly the characteristic forms of vegetation in the northern lowland of Asia; the characteristic forms of animal life. In the same manner describe the distribution of life forms in the highland region; on the southern and southeastern slopes of Asia. Locate the two races of men which inhabit Asia. Locate four peoples of the white race; three peoples of the yellow race. How does Asia compare with Europe in population; with North America? Locate the two great regions of very dense population in Asia. More than three fourths of all the people in Asia live in these two regions, and about half the remainder live on the islands to the east and southeast. In what stage of culture are most of the people in Asia?

PEOPLE.

Civilization. More than half of all the people in the world have their homes in Asia. Nearly all of these people have gradually become somewhat civilized, though their civilization is as rude and imperfect as that of Europe was a thousand years ago. But it is different in many ways from the earlier civilization of Europe, for the peoples of Asia and of Europe mixed with one another very little in olden times. Therefore the languages, habits, dress, and manners of the peoples of Asia seem very strange to us, who have received our civilization from Europe.

Throughout most of Asia the women are considered as little more than servants or slaves. They are seldom educated and are often bought and sold. Boys and men are also enslaved in many of the countries, and are often very cruelly treated. None of the native peoples of the mainland of Asia have yet learned to recognize the value of the steam engine, or of improved machinery and implements of any kind, and nearly everything is done by human labor or by that of domestic animals. There is little profit in such slow labor, and hence the great mass of the people are wretchedly poor. In the sparsely settled regions the people use animal food chiefly. Why? In the moister regions of the southeast food is mainly vegetable and is much more plentiful, and that is why these regions are more densely peopled. But even there, when the crops fail in any large district, a terrible famine occurs and thousands of people starve, because there are few or no railroads, steamboats, or good roads by which food may be quickly brought from other districts. The few railroads and the little improved machinery are in the hands of the comparatively few Europeans who have settled in Asia.

Commerce. Because of the lack of improved implements and means of transportation, the products and commerce of Asia are slight in comparison with its large population. Although there are more than twice as many people in Asia as in Europe, the foreign

commerce is but one fourth as great as that of Europe, and is less than twice as great as that of the United States.

Fully nine tenths of the foreign commerce of Asia is carried on by the countries and islands in the southeast which have a heavy or moderately heavy rainfall.

Governments. None of the native peoples on the mainland of Asia have become civilized



A house in Russian Turkestan.

enough to know how to organize governments for the benefit of the mass of the people. Most of the countries, therefore, are absolute monarchies, much as the countries of Europe were a thousand years ago. The ruler holds his position by force, and has supreme power over the lives and property of his subjects, whom he often treats cruelly and unjustly.

What great country in southern Asia belongs to Great Britain? Anam, on the southeast coast, belongs to the Republic of France. These nations send Europeans to govern these countries as colonial possessions. All the other countries of the Asiatic mainland are governed by absolute monarchs. What island empire is east of Asia? The Japanese are the most civilized native people of Asia. They have recently adopted many of the customs of European civilization; among others, a limited monarchy as their form of government. The United States, the Netherlands, and Great Britain control the islands between the Empire of Japan and Australia.

Religion. Southwest of the Kirghiz Steppe and the Indus River, Mohammedanism is the prevailing religious faith in Asia, although there are many Christians and Jews in Asia Minor. In India the mass of the people believe in Brahmanism, but there are also very many Mohammedans, and Mohammedanism is the prevailing religion in the East Indies. In Indo-China, China, Korea, and Japan most of the people are Buddhists, while in Siberia the Greek form of the Christian religion prevails.



In the city of Bokhara.

ern parts. In southern Siberia are broad tracts of fertile land and grassy plains, which furnish pasturage for thousands of cattle and horses. Gold is found along the edge of the highland, and there are deposits of coal, iron, and other minerals.

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Oil works at Baku.

COUNTRIES.

ASIATIC RUSSIA. By what name is the greater part of Asiatic Russia called? Describe the boundaries of Asiatic Russia. Find the distance in miles from the Ural Mountains to the Sea of Okhotsk. Describe the surface of Siberia. Name its great rivers. Why are there no seaports on the northern coast? What kind of climate has Siberia? Why?

The summers of Siberia, though short, are so warm that grain ripens almost as far north as the Arctic Circle; but in winter the cold is intense even in the southern parts.

near the seacoasts and mountains some rain falls. Along the southern shores the date palm flourishes, and there are fine forests of cedars, elms, and oaks. All kinds of fruit grow in the lowlands. Wheat, barley, rice, cotton, and opium are cultivated. The raising of cattle, sheep, camels, and horses is the chief business of many of the people.

Besides the Persians, who compose the greater part of the population, there are many Arabs, Armenians, and Turks in different parts of the country. The ruler of Persia is called the *shah*.

Handmade carpets and camel's-hair cloth are almost the only manufactures. Trade is carried on by caravans. There are practically no railroads or carriage roads. The principal exports are opium, pearls, carpets, and dates.

What is the capital of Persia? *Teheran* and *Tabriz* are the chief centers of the caravan trade. *Ispahan*, the former capital, has great bazars and magnificent palaces. *Bushire* and *Barfrush* are the most important ports.

AFGHANISTAN. What countries surround Afghanistan? Describe its surface and its drainage.

Although the climate of Afghanistan is dry, the soil is fertile and in many parts of the country yields two harvests each year. Wheat and barley are harvested in summer, and rice, millet, and corn in autumn. Fruits are abundant, and drugs are produced.

The population of Afghanistan is made up of many tribes, mostly of Aryan descent, all loosely united under one ruler called the *ameer*.

Next to agriculture and stock raising the chief industries are the making of silk goods, felts, and carpets. Other exports are horses, spices, and fruits.

Name the capital. *Herat*, *Kandahar*, and *Kabul* are fortified towns and centers of considerable caravan trade.

BALUCHISTAN. By what countries and sea is Baluchistan bordered? Describe its surface and climate.

Baluchistan is about half as large as the state of Texas. It is governed by a native ruler, or *khan*, who is under the control of the British government in India. The people are very similar to those of Afghanistan. Much of the country is stony and barren, but there are good pastures, and the nomad tribes are en-



Persian grocery.

gaged in raising camels and horses, sheep and goats. Name the capital.

INDIA. Bound India. Describe the surface and drainage of Hindustan; of the Dekkan. Describe the climate. What two rivers are fed by the snows on the northern slopes of the Himalayas? What branch of the Indus pierces these mountains? Which slope of the Himalayas does the Ganges drain?

India is about half as large as the United States, but its population is more than four times as great. There are people of various types in all parts of the country, yet they are but little mixed. By far the largest part of the population consists of Hindus, a dark-skinned branch of the Aryan people.

Within the past three centuries the English, French, and Portuguese established trading stations on the coasts. The British finally gained control over nearly all the native states, and now



Weaving tapestry, Persia.

govern almost the entire country, although the number of British people in India is quite insignificant in comparison with the dense native population. The Queen of Great Britain is called the Empress of India. She appoints a British governor general, or viceroy, who lives in India and governs the country under the direction of the executive branch of the British government in London.

The Hindus had attained a somewhat high degree of civilization long before the Europeans entered their country. Some of the most beautiful temples in the world are the work of the Hindus centuries ago. They had a written language, an ancient literature, and a highly organized system of society. The peculiarity of the Hindu social system is its division into *castes*, or fixed classes. A Hindu must live, marry, and die in the same class of society and follow the same occupation as his father. This system very naturally discourages all kinds of progress, and the Hindus have made no improvement among themselves for a long time. The houses of the common people are small and miserable hovels, without floors and with little or no furniture. The farming implements and methods are of the rudest description, and the flour or meal is generally ground by hand as shown in the picture on the opposite page.



Persian woman.

The population of India is most dense in the Ganges valley and in those parts of southeastern Dekkan where irrigation is successful. It is least dense in the dry and barren parts of the Indus valley.

Most of the people live by agriculture, raising millet and rice for their own use, and various other products for export. Rice, jute, and bamboo grow in the delta of the Ganges. Farther up the river the mulberry and the opium poppy are cultivated. Cotton, wheat and pepper are grown in the Dekkan, where there are also large plantations of coffee. Tea, and the cinchona

Grinding millet, India.



Native boats, Ceylon.

tree from South America, are cultivated on the Himalaya foothills. In the valley of the Brahmaputra the growing of seeds for making oil similar to linseed oil is one of the most important industries.

Many miles of irrigating canals have been dug in the Ganges valley, and reservoirs have been built in the Dekkan to supply water in times of drought. Yet the rainfall is so irregular in many districts that terrible famines frequently occur on account of the failure of crops.

Elephants and camels, as well as buffaloes and zebus, are used as beasts of burden.

Manufacturing industries are being rapidly developed by the Europeans, and cotton, woolen, and jute goods, and paper are made. There are some iron mines in India, and many coal mines, but they are not close together, and there are consequently but few manufactures of iron. Most of the manufactured goods are still made by hand: fine cottons and silks, gold embroideries, soft cashmere shawls, carved ivory, jewelry, beautiful rugs, and embroidered leather goods in great variety are produced in this way by the native workmen.

The British have caused good roads to be constructed in nearly all parts of the country, and have built more than 20,000 miles of railroad. These are the chief means of transportation, for the detritus in the rivers of northern India, and cascades in the rivers of the Dekkan, interfere with the use of these streams as trade routes.

The foreign commerce of India is nearly as great as that of the United States, and almost equals that of all the rest of Asia. About half of it is with Great Britain, and a large part of the remainder with China.



Traveling in India.

The principal exports are cotton, jute, rice, oilseeds, opium, tea, hides, indigo, and wheat. Cotton cloth, machinery, ironware, and refined sugar are the chief imports.

Calcutta is the capital and chief seaport. *Bombay* is the largest city on the western

coast, and is important as the chief port for the shipment of Indian cotton. Each of these cities is about the size of Brooklyn. *Madras* and *Haidarabad*, each about the size of Boston, are great centers of trade. *Lucknow*, *Benares*, and *Delhi* are large and important native cities.

Nepal and *Bhutan* are native monarchies in northern India. *Bhutan* is partly in British control. *Nepal* is tributary to China.

Ceylon is a British colony by itself. Its chief products are tea and cocoanuts. Name the chief city.



Stairway for bathers, Benares.

THE COUNTRIES OF INDO-CHINA. What divisions of British India lie east of the Bay of Bengal? What narrow peninsula extends still farther south? What British possession occupies the southern part of the Malay peninsula? What country comprises the eastern part of Indo-China? What is the country in the central part called?

Name the chief rivers and gulfs of Indo-China. In what direction do the mountain ranges extend?

Most of the people of Indo-China are of the Mongolian type, but there are many Malays in the south. In the mountainous regions there are but few inhabitants, but in the valleys and river deltas the population is very dense.

The chief products of Indo-China are rice, sugar, spices, lumber, and tin. There are mines of coal, iron, copper, silver, and gold, but the resources of none of the countries have yet been fully developed. The foreign com-



A boat on the Irawadi.

merce of Indo-China is greater than that of any other part of Asia except India. It is conducted almost entirely by Europeans, although many of the merchants are Chinese.

Upper and Lower Burma are part of the British government of India, but the Straits Settlements form a separate British colony. Anam, with Tonkin, Cambodia, and Cochin China, is under the control of the French, though Anam and Cambodia have native rulers. Siam is a native kingdom, about four times as large as the state of New York.

Name and locate the capital of Siam. *Bangkok* is built partly on piles in the river and is about the size of Detroit. *Mandalay* and *Rangoon* are the principal cities and trade centers of Burma. *Saigon* is the seat of government for French Indo-China. *Singapore*, in the Straits Settlements, exports tin and spices, and is important as a coaling station for steamers and as a center of trade for the surrounding region.

THE CHINESE EMPIRE. In what part of Asia is the Chinese Empire? What waters border it? What mountains are on its southwestern border; on its northwestern border? What plateau forms the western part; the northern part? Compare it with the United States and with Europe in area and population. What are its two great rivers?

Into what does each flow? Besides China proper, what four other countries are included in the Chinese Empire?

China proper, or the Middle Kingdom, as the Chinese call it, contains about nine tenths of the population of the empire. Why is it better fitted for habitation than other parts of the empire? The Yangtze is navigable for hundreds of miles by the largest ocean steamers. This river, with its tributaries, and the Si River to the south afford the only easy means of communication in the interior. The Hoang is loaded with sediment and is so obstructed by sand bars that it is not navigable. It often overflows its banks, causing widespread disaster to villages and farms, and several times it has changed its course entirely.

Where is the Grand Canal, and what two rivers does it connect? It was built more than a thousand years ago and is still much used as a highway of trade and communication. There are several other canals in different parts of the country, but owing to the prejudices of the Chinese there are few railroads. The public roads are in a poor condition; and, away from rivers and canals, goods are carried for the most part on the backs of porters.

The people of China belong to the Mongolian type of the yellow race, and are peculiar in language, religion, customs, and dress. Buddhism is a prevailing religion, but there are many followers of Confucius, a Chinese philosopher who lived many centuries ago. The strangest feature of their religion is the worship of their ancestors. This makes them unwilling to

leave the ways which these ancestors followed; hence they are suspicious of foreigners and dislike foreign customs. Their dress and manners, and even the construction of their houses, are regulated by laws made hundreds of years ago. It was not until near the middle of the nineteenth century that they consented to have any intercourse with other nations. Yet they were among the first people in the world to become civilized. Silk spinning and weaving were brought to great perfection by them many centuries before such arts were known in Europe. The Chinese were among the first people to make paper; they invented printing and discovered gunpowder long before such things were known to Europeans. Tea was introduced into Europe from China.

The government is an absolute monarchy, in which the emperor appoints his own successor. The officers of the government are selected by the emperor from those scholars best informed in Chinese learning. Every candidate for office must pass severe examinations.

Education is general among the men, but neglected among the women. The language has no alphabet; each written character stands for a syllable or word, and a Chinese boy must learn to know several thousand of these characters by sight.

Houses on the Mekong.



A Burmese family.

yield lumber, lacquer gum, and camphor. The bamboo is abundant, and is used for many purposes.

There are few sheep or cattle; hence little wool or leather is obtained, and dairy products are rare. But many hogs and fowls are raised, and the Japanese fisheries are valuable.

The chief mineral products are silver, copper, coal, iron, and sulphur.

Several branches of manufacture, as we understand the term, have lately been started in Japan, and are flourishing, but for many centuries the Japanese have been producing wonderfully skillful and artistic handiwork. Japanese silk, cloth, and embroidery, jute floor mats, paper, and bamboo work, matches, inlaid metal work, lacquered ware, and pottery are now found in all European and American cities.

Railroads are being built, and steam vessels are being used for coasting trade, so that commerce is very active.



Japanese sawyers.

The foreign commerce is as great as that of all northern and western Asia. The chief exports are raw and manufactured silk, but tea, rice, coal, and copper are also important exports.

The Japanese are by far the most civilized of the Asiatic peoples. They are of mixed Mongol and Malay blood, rather small of stature, but with lively, pleasing features. For many centuries they lived secluded from other nations, cultivating their peculiar arts, and having a literature of their own. About fifty years ago, realizing that they were less strong than the nations of Europe, they invited American and European specialists and teachers into their country, sent their brightest youths to study in our cities, and established schools, railroads, postal and telegraph systems, factories, and an army and navy, after European or American models. Their emperor rules by the aid of a parliament consisting of two houses, the members of one being nobles and the members of the other being representatives elected by the people.

Education is almost universal, and newspapers are read by the people of the cities; but most of the people are still Buddhists or worship their ancestors, dress in loose robes, with girdles and straw sandals, and follow the ancient customs of the country. Their manners are courteous, their wits quick and keen, and their ambition great.

Tokyo, the capital, is a city of rapid growth and contains over a million people. The foreign quarter is much like a European city. *Yokohama*, its seaport, is the chief cen-

ter of foreign commerce. *Osaka* and *Kyoto* are the seats of important manufactures.

THE PHILIPPINE ISLANDS. In what direction from Japan are the Philippine Islands? What waters surround them? Through how many degrees of latitude do they extend? Describe their climate. Name the chief island. What is the capital?

The Philippine Islands were the most important of the Spanish colonial possessions, but the control of these islands passed to the United States after the war of 1898. There are about two thousand islands in the group, the largest being about the size of Kentucky. The bulk of the population are Malays, but there are many Chinese, and a few Spaniards. Manila is the capital. Rice, sugar, Manila hemp, and tobacco are the chief products.

THE EAST INDIES, OR THE MALAY ARCHIPELAGO. Name the largest islands of this group. Name the seas and straits between the islands. Describe the climate.

The surface of these islands is rugged and mountainous. Among the islands are many active volcanoes. The soil is generally fertile. In the larger islands are dense and extensive forests.

The greater part of this group of islands belongs to the Netherlands and is known as the Dutch East Indies. Most of the inhabitants are Malays, but there are many Chinese and a few Arabs. The Europeans, who are the ruling class, form but a small part of the population.

Java is the most important of the Dutch possessions. It is about as large as the state of New York, but contains four times as many inhabitants. It produces much cane sugar, and, after Brazil, more coffee than any other country in the world. Batavia is the capital and commercial center of the Dutch East Indies.

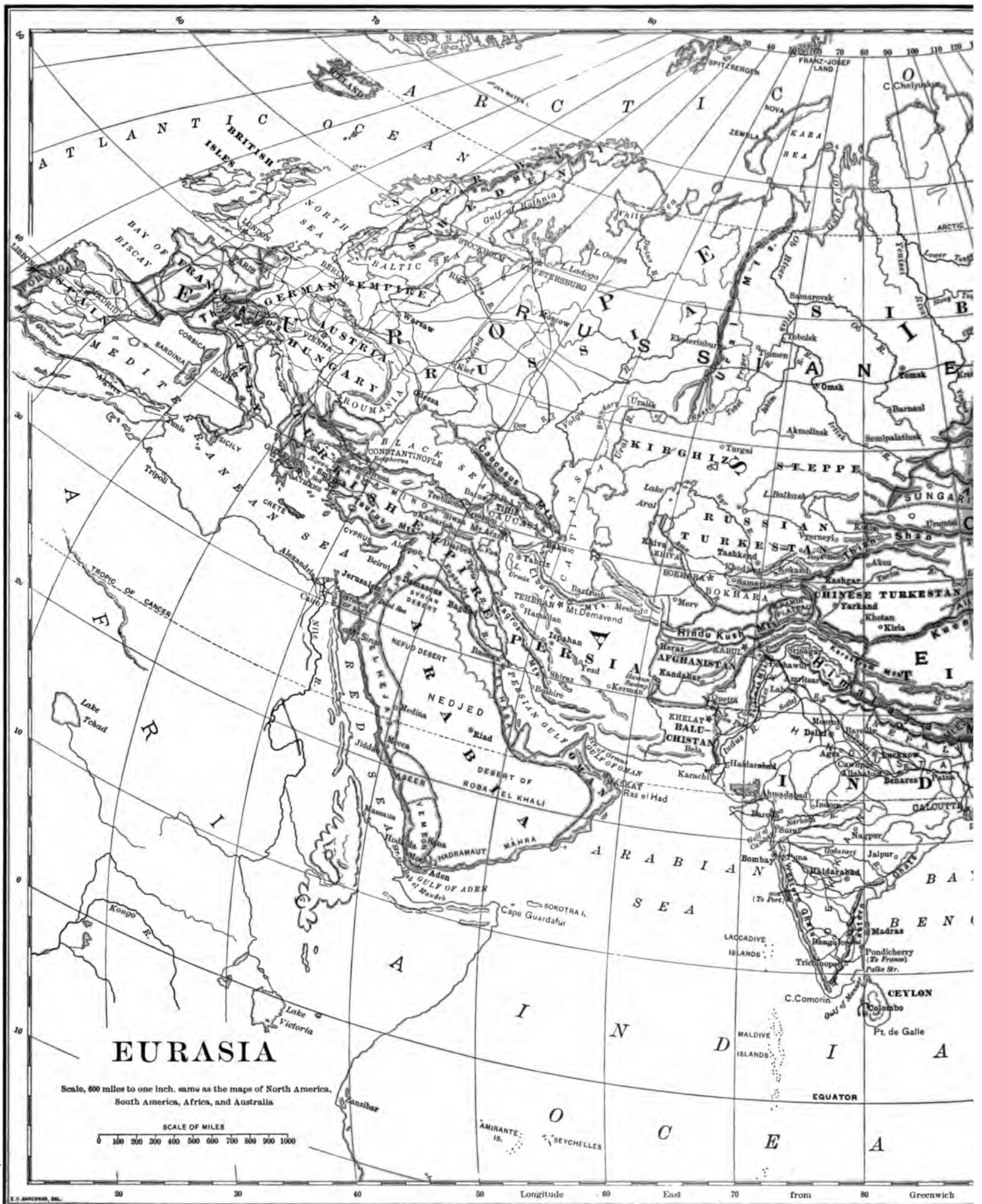
Sumatra produces coffee, black pepper, rice, and India rubber, and has mines of gold, coal, tin, and lead. *Banca* and *Billiton* supply most of the world's output of tin.

Borneo is a little larger than Texas. Some parts of its wooded interior have not yet been explored. Most of the inhabitants are Malays. The northern part belongs to Great Britain, the rest to the Netherlands. The chief products are timber, sago, rice, coffee, pepper, gutta-percha, tapioca, and tobacco.

Supplemental Work. Collect pictures and objects illustrating the customs and occupations of Asiatic peoples. Read "Carpenter's Geographical Reader, Asia;" "Boy Travellers in the Far East," by T. W. Knox; "Story of Japan," by R. Van Bergen; "When I was a Boy in China," by Yan Phou Lee; "Child Life in Chinese Homes," by Mrs. Bryson; "Our Boys in China" and "Our Boys in India," by H. W. French; "Old Deccan Days," edited by Frere; "With Clive in India" and "On the Irrawaddy," by Henty; "Java," by S. J. Higginson; "The Lost City," by David Ker; "Life with Trans-Siberian Savages," by B. D. Howard; "Tent Life in Siberia," by Kennan; "For Name and Fame," by Henty; "Behind an Eastern Veil," by C. J. Wills; "For the Temple," by Henty; selections from Longfellow's "Poems of Places."



Threshing rice, Japan.



ASIA.



Review of Physical Features and Life. (pp. 113-117.) What physical features are often considered boundaries separating Eurasia into the two grand divisions of Europe and Asia? How do these divisions compare in size? Name the oceans and ocean arms which border the northern, eastern, and southern coasts of Asia. Locate five peninsulas of Asia, and name the waters they separate. What three island groups are off the east coast? Name three great rivers of the Arctic slope; four of the Pacific slope; four of the Indian Ocean slope. Is the interior region between the basins of these rivers entirely highland? Explain the relation between the rainfall and the drainage of this interior region. Describe briefly the great highland of Asia, its extent, altitude, mountain ranges, climate, and surface peculiarities. Describe briefly the great northern lowland; the Pacific slope; the Indian Ocean slope.

Locate and describe briefly the characteristic forms of vegetation in the northern lowland of Asia; the characteristic forms of animal life. In the same manner describe the distribution of life forms in the highland region; on the southern and southeastern slopes of Asia. Locate the two races of men which inhabit Asia. Locate four peoples of the white race; three peoples of the yellow race. How does Asia compare with Europe in population; with North America? Locate the two great regions of very dense population in Asia. More than three fourths of all the people in Asia live in these two regions, and about half the remainder live on the islands to the east and southeast. In what stage of culture are most of the people in Asia?

PEOPLE.

Civilization. More than half of all the people in the world have their homes in Asia. Nearly all of these people have gradually become somewhat civilized, though their civilization is as rude and imperfect as that of Europe was a thousand years ago. But it is different in many ways from the earlier civilization of Europe, for the peoples of Asia and of Europe mixed with one another very little in olden times. Therefore the languages, habits, dress, and manners of the peoples of Asia seem very strange to us, who have received our civilization from Europe.

Throughout most of Asia the women are considered as little more than servants or slaves. They are seldom educated and are often bought and sold. Boys and men are also enslaved in many of the countries, and are often very cruelly treated. None of the native peoples of the mainland of Asia have yet learned to recognize the value of the steam engine, or of improved machinery and implements of any kind, and nearly everything is done by human labor or by that of domestic animals. There is little profit in such slow labor, and hence the great mass of the people are wretchedly poor. In the sparsely settled regions the people use animal food chiefly. Why? In the moister regions of the southeast food is mainly vegetable and is much more plentiful, and that is why these regions are more densely peopled. But even there, when the crops fail in any large district, a terrible famine occurs and thousands of people starve, because there are few or no railroads, steamboats, or good roads by which food may be quickly brought from other districts. The few railroads and the little improved machinery are in the hands of the comparatively few Europeans who have settled in Asia.

Commerce. Because of the lack of improved implements and means of transportation, the products and commerce of Asia are slight in comparison with its large population. Although there are more than twice as many people in Asia as in Europe, the foreign

commerce is but one fourth as great as that of Europe, and is less than twice as great as that of the United States.

Fully nine tenths of the foreign commerce of Asia is carried on by the countries and islands in the southeast which have a heavy or moderately heavy rainfall.

Governments. None of the native peoples on the mainland of Asia have become civilized



A house in Russian Turkestan.

enough to know how to organize governments for the benefit of the mass of the people. Most of the countries, therefore, are absolute monarchies, much as the countries of Europe were a thousand years ago. The ruler holds his position by force, and has supreme power over the lives and property of his subjects, whom he often treats cruelly and unjustly.

What great country in southern Asia belongs to Great Britain? Anam, on the southeast coast, belongs to the Republic of France. These nations send Europeans to govern these countries as colonial possessions. All the other countries of the Asiatic mainland are governed by absolute monarchs. What island empire is east of Asia? The Japanese are the most civilized native people of Asia. They have recently adopted many of the customs of European civilization; among others, a limited monarchy as their form of government. The United States, the Netherlands, and Great Britain control the islands between the Empire of Japan and Australia.

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Persian woman.

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Name the chief rivers and gulfs of Indo-China. In what direction do the mountain ranges extend?

Most of the people of Indo-China are of the Mongolian type, but there are many Malays in the south. In the mountainous regions there are but few inhabitants, but in the valleys and river deltas the population is very dense.

The chief products of Indo-China are rice, sugar, spices, lumber, and tin. There are mines of coal, iron, copper, silver, and gold, but the resources of none of the countries have yet been fully developed. The foreign com-



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THE CHINESE EMPIRE. In what part of Asia is the Chinese Empire? What waters border it? What mountains are on its southwestern border; on its northwestern border? What plateau forms the western part; the northern part? Compare it with the United States and with Europe in area and population. What are its two great rivers?

Into what does each flow? Besides China proper, what four other countries are included in the Chinese Empire?

China proper, or the Middle Kingdom, as the Chinese call it, contains about nine tenths of the population of the empire. Why is it better fitted for habitation than other parts of the empire? The Yangtze is navigable for hundreds of miles by the largest ocean steamers. This river, with its tributaries, and the Si River to the south afford

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Where is the Grand Canal, and what two rivers does it connect? It was built more than a thousand years ago and is still much used as a highway of trade and communication. There are several other canals in different parts of the country, but owing to the prejudices of the Chinese there are few railroads. The public roads are in a poor condition; and, away from rivers and canals, goods are carried for the most part on the backs of porters.

The people of China belong to the Mongolian type of the yellow race, and are peculiar in language, religion, customs, and dress. Buddhism is a prevailing religion, but there are many followers of Confucius, a Chinese philosopher who lived many centuries ago. The strangest feature of their religion is the worship of their ancestors. This makes them unwilling to

leave the ways which these ancestors followed; hence they are suspicious of foreigners and dislike foreign customs. Their dress and manners, and even the construction of their houses, are regulated by laws made hundreds of years ago. It was not until near the middle of the nineteenth century that they consented to have any intercourse with other nations. Yet they were among the first people in the world to become civilized. Silk spinning and weaving were brought to great perfection by them many centuries before such arts were known in Europe. The Chinese were among the first people to make paper; they invented printing and discovered gunpowder long before such things were known to Europeans. Tea was introduced into Europe from China.

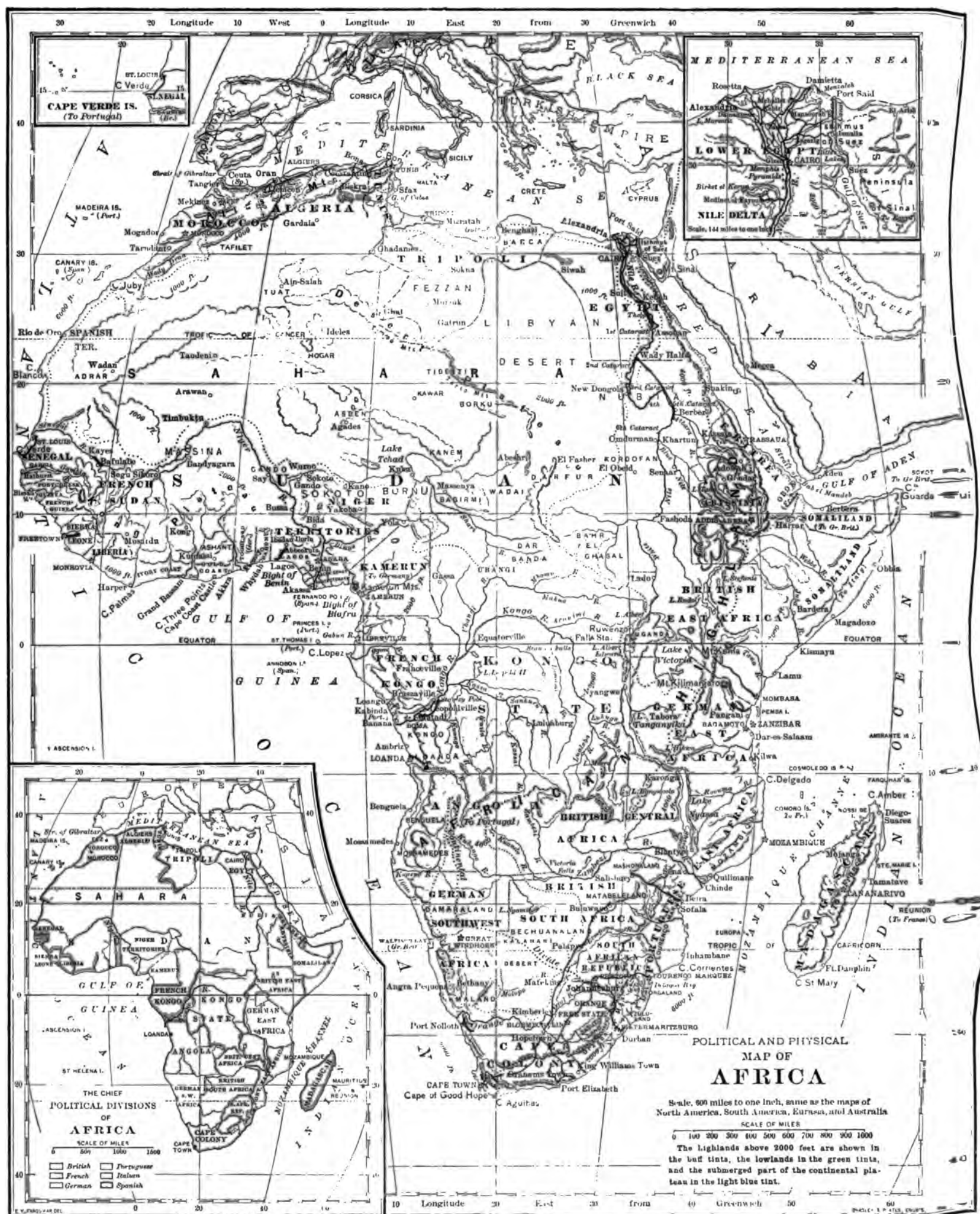
The government is an absolute monarchy, in which the emperor appoints his own successor. The officers of the government are selected by the emperor from those scholars best informed in Chinese learning. Every candidate for office must pass severe examinations.

Education is general among the men, but neglected among the women. The language has no alphabet; each written character stands for a syllable or word, and a Chinese boy must learn to know several thousands of these characters by sight.

Houses on the Mekong.



A Burmese family.





Some animals of Africa.

Lake Tchad, although having no outlet to the sea, is a fresh-water lake. When do the rains fall in this region? (p. 27.) At that season the lake is a sheet of water overflowing by an outlet to the northeast into a lower region. In the dry season the lake becomes a great marsh, and its outlet is a *wady*, or dry stream bed. Near the southern edge of the Atlas highland are several deep depressions in the lowlands, called *shotts*; they contain salt lakes during part of the year.

Life. What animals and plants are peculiar to the African life region? (pp. 30, 31.) Where are the dense forests? Where are the open forests? Where are the deserts? (map, p. 28.) What is the great northern desert region called (map, p. 144); the southern desert region?

More than a third of Africa consists of deserts. Some parts of these arid regions are covered with shifting sands and wind-formed dunes, with here and there fertile oases. Other parts are stony and barren, and still others rough and mountainous. In the oases grow date palms and such other plants as thrust their roots deep down to the ground water. Along the edges of the deserts are plains where grow acacias and rough grasses like those of our own plateau region.

In the dense forests of central Africa are sago and oil palms, mimosa and rubber trees, besides the other plants peculiar to this life region. Along the coasts are marshes, where are mangrove trees and enormous grasses resembling cane and bamboo. Where are the grass lands of Africa? (map, p. 28.)

More large wild animals are found in Africa than in

any other of the grand divisions. But these are rapidly being exterminated by white hunters. Snakes and insects abound.

People. To what race do most of the people in central and southern Africa belong? (p. 34.) To what race do the people in northern Africa belong? What parts of Africa have a dense or moderately dense population? (map, p. 34.) In what parts is the population very sparse? How does the distribution of people correspond with the distribution of rainfall? (map, p. 26.)

None of the negro tribes in Africa have advanced to the stage of civilization, and many of them are still in the savage state. The white peoples who occupy the countries bordering on the Mediterranean are chiefly Arabs, Berbers, and Jews. Many are quite dark-skinned. In most parts of Africa, especially near the coasts, Europeans have established missionary settlements and colonies. In the south they have built towns and roads, improved the country, and introduced the arts of civilization.

For many centuries negroes were carried from Africa into various countries as slaves. Into what parts of America were negro slaves introduced? (pp. 49, 107.) Most of these slaves were obtained from the countries on the west coast. The barbarous tribes in central Africa still make slaves of the prisoners whom they capture in war, selling them to the Arab slave-dealers from the eastern coast. These Arabs often make raids into the interior for the purpose of obtaining ivory and capturing slaves.

Supplemental Work. Draw on a large scale a map of Africa, naming the chief natural features. Model Africa. Write a comparison



A camp on the Sahara.

chief towns? The sultan resides part of the time in one and part of the time in the other. *Algeria* is part of the French Republic. What is its capital? It is the chief commercial city and seaport. At Oran there are valuable marble quarries. Biskra, in a beautiful oasis on the edge of the desert, is the terminus of important caravan routes. The government of Tunis is nominally still in the hands of a native ruler called the *bey*, but a French *resident* really has most of the governing power. What is the capital of this country?

THE SAHARA. How does the Sahara compare with the United States in size?

The word *sahara* means "desert," and the region to which it is applied is the largest desert in the world. This region is not entirely arid, however, for there are many oases; some of them are many miles in extent, and there date palms, olive trees, wheat, and barley are grown. The region is very sparsely peopled by wandering tribes of Arabs. The most important product of the Sahara is salt from deposits at *Kawar* and *Taudeni*. Most of this is bartered to the natives of central Africa.

Supplemental Work. Find out about the life and work of "Chinese Gordon." Find out about the troubles our country once had with the Barbary pirates. Read "A Family Flight over Egypt and Syria," by Hale; "The Romance of a Mummy," by T. Gautier; "Winters in Algeria," by F. A. Bridgeman; or "The Cat of Bubastes," by Henty.

CENTRAL AFRICA.

Central Africa includes the region between the Sahara and the Zambezi River. Describe the surface and drainage of this region; the distribution of heat and moisture. Where are the forests? (map, p. 28.) Where are the prairies? What is the region just south of the Sahara called? (p. 144.)

The climate of the central plateau is more healthful than that of the coast, and the soil is generally fertile. The forests contain valuable woods, rubber-yielding vines, trees yielding gums from which varnish is made, the palm, from whose fruit is obtained palm oil used in making soap, and other useful plants. In these forests are herds of elephants, and in the rivers are hippopotamuses.

The tusks and teeth of these animals are exported as ivory. In parts of the region the tsetse fly carries a disease that is fatal to cattle and horses; but throughout the upper meadow lands cattle and sheep may be raised, while bananas, corn, rice, cotton, tobacco, cacao, sugar, and, at higher elevations, wheat can be grown with ease.

This region is the true home of the negro, and in it live most of the negroes in the world. What part of the region is most densely peopled? (map, p. 34.) The natives of the interior are generally more intelligent and sturdy than those near the coast. Many of them weave a cloth of palm fiber, make rude canoes, spears, and bows and arrows, and many use firearms and weapons obtained from white men. Some cultivate the soil, and some are good fishermen. In this region also live the pygmies, a dwarfish people of the black race. The eastern Sudan is occupied by a Mohammedan people of mixed Arab and negro descent, who have disputed the Egyptian control of this region.

It is only recently that central Africa has been explored by civilized man, but now five European nations claim nearly the whole of the region.

Name and locate the regions claimed by various European nations on the east coast between the Strait of Bab el Mandeb and the Zambezi (small map, p. 144); on the west coast of central Africa, south of the mouth of the Niger. What state occupies much of the interior of equatorial Africa? Locate and name the owners of the divisions of the west coast between the Niger and Cape Verde. What European nation claims most of the interior of this region?

The European "possessions" in central Africa have generally grown from a few trading settlements made along the coasts by white men. After the traders had secured a foothold, the home government sent out soldiers and officers to protect and manage the affairs of the colony, and to extend its "sphere of influence" in the tributary country in the interior.

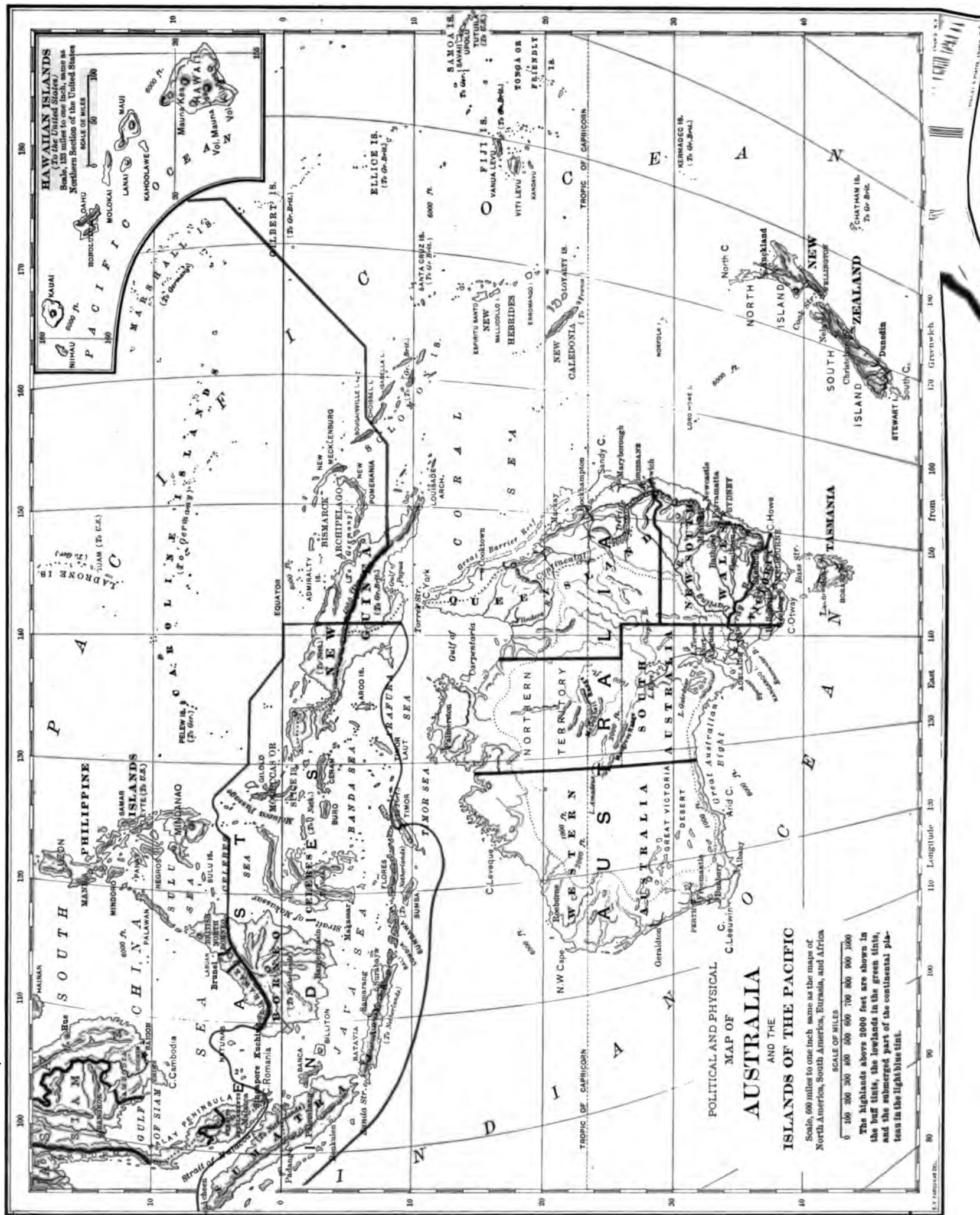
The exports from most of these possessions are similar, and consist chiefly of palm oil, rubber, ivory, varnish gums, hides, and some cotton, sugar, and coffee.

Sierra Leone was founded during the time when the slave trade was flourishing, and was intended as a place of refuge for negroes rescued from slave ships. *Liberia* is a negro republic. It was formed during the time of slavery in our country by some of our citizens as a home for freed slaves from the United States. Its capital was named after one of our presidents.

The *Kongo State* was established by the European powers for the purposes of trade. The King of the Belgians was chosen its ruler, although



Trading post on the Kongo.



but the great kangaroos and the ostrichlike cassowaries and emus live on the open plains.

People. How does Australia compare with Ohio in size; in population? Australia is the most thinly settled of all the grand divisions of the land. What part of Australia is least sparsely settled? (p. 34.) Fully three fourths of all the people live in this southeastern portion, while much of the western portion is practically uninhabited and but partly explored.

When white men first settled in Australia, about a hundred years ago, they found its only inhabitants to be a few tribes of degraded, black-skinned savages. Of these but few remain. Most of the present inhabitants are emigrants from the British Isles or their descendants, though there are some Chinese, Malay, and Hindu laborers.

About the beginning of the nineteenth century some of the emigrants brought the first sheep and cattle to Australia and started the industry of stock raising. Australia is now the greatest of wool-producing, and one of the greatest meat-exporting countries. Nearly one half of the land in Australia is devoted to sheep farms and cattle ranges. Agriculture is carried on with improved machinery in the moist east and south coast region, as in the United States, and some wheat is exported, but all the crops raised have only half the value of the wool and meat.

Gold, silver, coal, copper, and tin are mined principally on the inner slope of the eastern highland. Nearly one fourth of the world's supply of gold comes from Australia, yet the yearly product from all the mines is but one fifth as valuable as the pastoral and farm products.

More than half the people live in cities, and manufacturing is an important industry, but much cloth, machinery, and general manufactures are imported. About three fourths of the foreign trade is with Great Britain. There is an extensive system of railroads in the southeast, and the continent is connected with Eurasia by telegraph cable.

Government and Divisions. Australia belongs to Great Britain and is divided into five colonies, which, with Tasmania, form the Commonwealth of Australia. This federation has a governor-general appointed by the queen, and a parliament to which the people elect members. Name the colonies of Australia. Which is the largest; the smallest?

Bound Victoria. Describe its surface. Name its capital. It is the great agricultural and coal-mining colony, and has also large pastoral and manufacturing interests. The chief exports are wool, gold, meat products, and wheat. Melbourne, about as large as Boston, is the center of



Native Australian.

many railroad lines, and the chief port of the colony. Ballarat is in the gold fields.

Bound New South Wales. Describe the surface. Name the capital. This is the oldest and wealthiest colony. It supplies one half of the wool product of Australia, besides much wheat, corn, sugar cane, and wine, and many oranges. Gold, silver, and coal are extensively mined. Sydney is but little smaller than Melbourne, and has as much larger foreign commerce.

Bound Queensland. Describe the surface. Name the capital. Nearly half the surface is forested. Corn and sugar cane are the chief crops. In the interior many sheep are pastured, and more than half the cattle in Australia. Much gold is mined, and some coal. There are many Chinese and people from the East Indian islands. The chief exports are wool, gold, preserved and frozen meats, tallow, and hides.

Bound South Australia. Describe its surface and name its capital. It has rich copper mines, and raises important crops of wheat and grapes. The chief exports are wool, wheat, flour, and copper. Adelaide is the only large city.

Bound Western Australia. Describe the surface and name the capital. Its coast regions are less fertile than is the surrounding country nearer the sources of the rivers.



In an Australian gold mine.

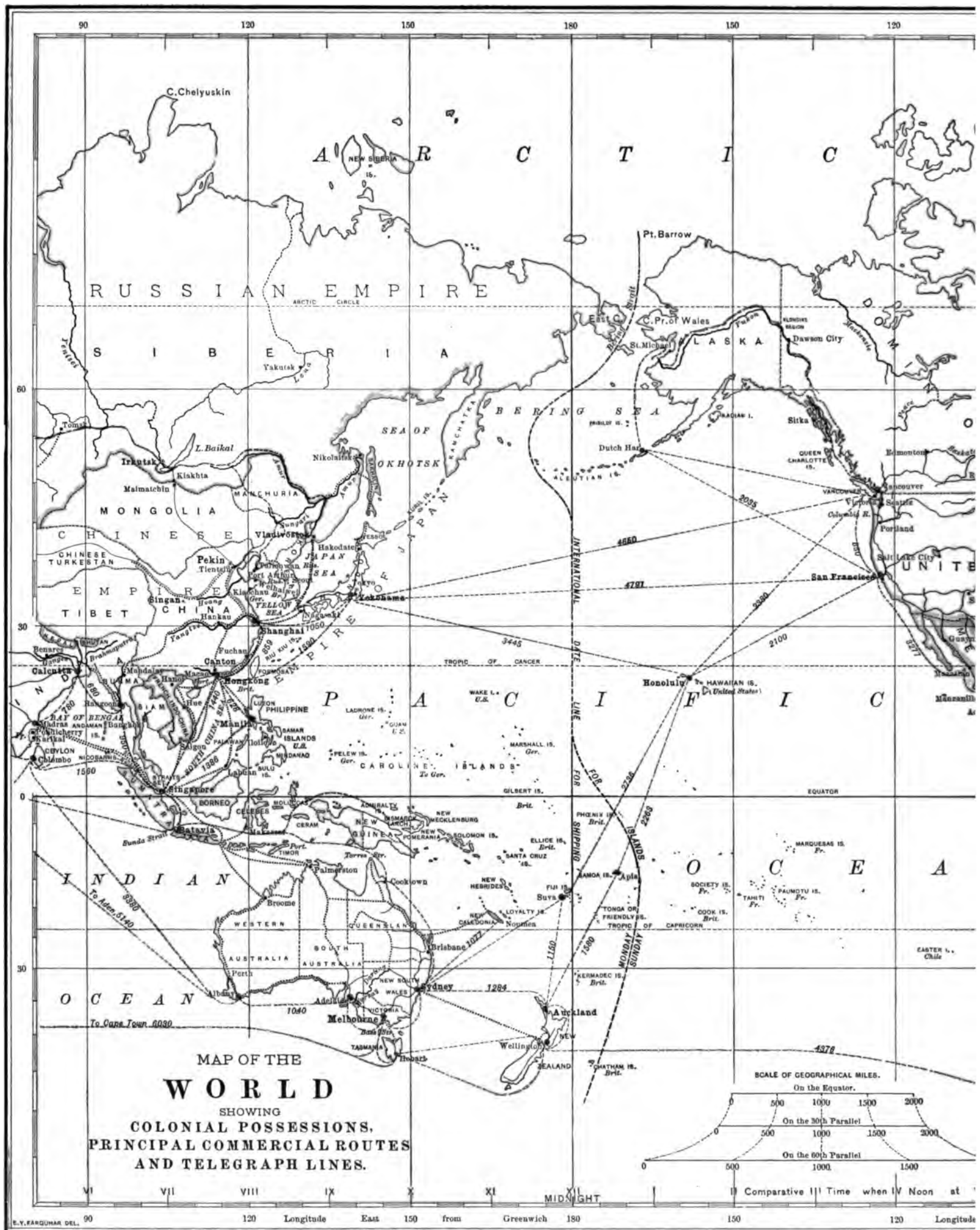
Gold forms the most valuable export, though much wool is also exported. Perth is the chief city.

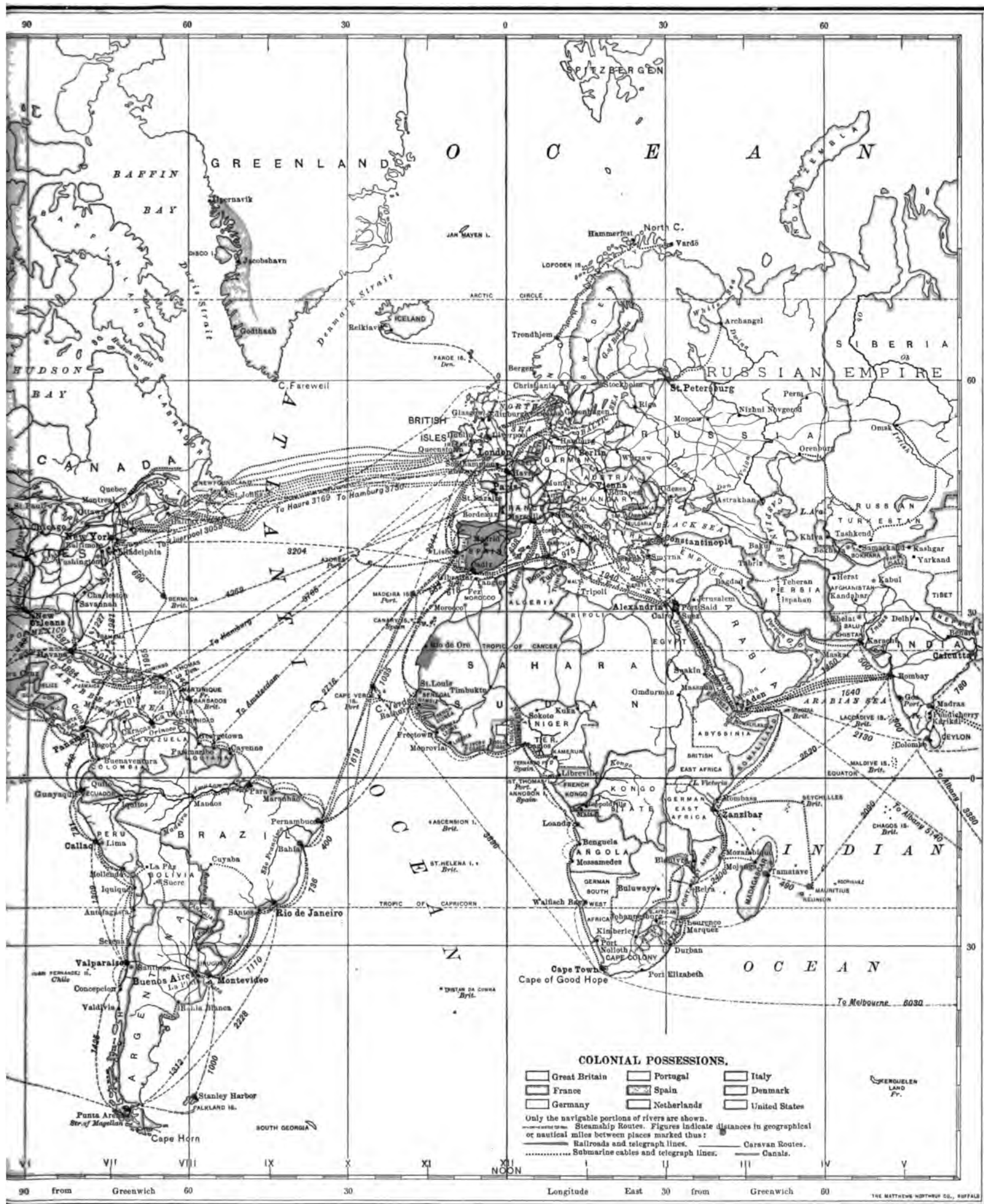
Supplemental Work. Draw circles representing the eastern and western hemispheres, and sketch the grand divisions. Model Australia. Read "Harry Heathcote of Gangooli," by Anthony Trollope.

ISLAND GROUPS.

TASMANIA. This island is more equable in climate than is Australia. Why? Describe its surface and name its capital.

Tasmania is surrounded by many small islands, and its coast has many bays. It is called the "Switzerland of the South," because of its mountainous surface.





CORRELATIONS AND COMPARISONS.

Physical Features. What is the earth's size; shape; movements? What are the effects of these movements on the distribution of light; heat? On the circulation of the air; of the ocean? On the tides? Compare the northern and southern hemispheres in their proportions of land and water; in the circulation of air; the distribution of heat.

Make a list of the world's great lowlands, and tell of each its climate, products, the nations which inhabit it. Make a list of the world's great plateaus, and tell of each its general elevation, climate, and products, and the nations which occupy it. Make a list of the world's great mountain systems and compare them in height; continuity; the number and height of their mountain peaks.

Indicate on the map evidences of movements of the earth's crust; of water erosion; of deposition; of the work of winds on surface forms. Mention some places where cataracts occur. Where are there continental glaciers; valley glaciers; evidences of former glaciers?

Name the chief rivers draining the Atlantic-Arctic slope in Eurasia; North America; Africa; South America. Compare these rivers of Eurasia with those of Africa in size of basin, volume of water, usefulness. Compare those of Eurasia with those of North America; those of South America with those of North America; those of Africa with those of South America. Name the chief rivers draining the Pacific and Indian Ocean slope in Africa; Eurasia; Australia; America. Compare these river systems of North America with those of Africa; those of North America with those of Eurasia; those of Eurasia with those of Africa; those of Australia with the others. Make a list of the world's great lake regions. Tell of each the names, causes, outlets, and uses of the chief lakes.

Name the world's great seas and bays; important isthmuses; straits; peninsulas; islands. Tell of each island or island group what you know of its origin, climate, and surface.

Climate. Where are the summers temperate and the winters cold? Compare these regions in latitude and altitude. What plants and animals live there? What races of men? How dense is the population? Where are the summers hot and the winters cold? Where are the summers hot and the winters temperate? Where is the entire year temperate? In what heat belts do the most advanced nations live in South America; in North America; in Eurasia; in Africa; in Australia?

Describe and account for the trade winds; equatorial calms; tropical calms; prevailing westerly winds; monsoons. Why do these belts move northward and southward during the year? What is the effect of this movement? Account for cyclones.

Make a list of the regions of heavy rainfall, and try to account for the existence of each. Locate the largest regions of moderately heavy rain. Compare the positions of the areas of interior drainage in the northern and southern hemispheres; in the two northern grand divisions; in the three southern grand divisions. Compare the positions of the rainless regions of the world; of the desert regions. Compare the maps on pp. 26 and 28; what are the chief farming regions of the world? What great regions suited by climate for farming are still forest-covered? Where are there great herding regions? Compare them in climate.

Life. Compare the northern and southern hemispheres in the peculiarity of their life forms. Name the great life regions. In which are the life forms most peculiar? Which two regions are most nearly alike in life forms? Which region is nearly identical with a continent? What regions cover parts of two grand divisions; only part of a grand division? Locate and account for three transitional regions. Which grand division contains forms belonging to three different regions? Describe the life forms of South America; North America; Eurasia; Africa, Australia.

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Make a list of the races of man. Tell of each where it is found; its advancement; the chief nations representing it.

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From the map on pp. 154, 155, tell through what places a message might pass if sent by telegraph and cable from New Zealand to San Francisco; from Valparaiso to Yokohama; from Cape Town to St. Petersburg.

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	1890 CENSUS.	MORE RECENT ENUMERATION.		1890 CENSUS.	MORE RECENT ENUMERATION.		1890 CENSUS.	MORE RECENT ENUMERATION.
Charleston, W. Va.	6,742		Laramie, Wyo.	6,368		Reading, Pa.	58,661	
Charlotte, N. C.	11,557		Las Vegas, N. M.	2,385		Reno, Nev.	8,563	
Chattanooga, Tenn.	29,100		Lawrence, Mass.	44,654	52,164 ('95)	Richmond, Va.	81,388	
Chelsea, Mass.	27,909	31,264 ('95)	Leadville, Col.	10,384		Roanoke, Va.	16,159	
Cheyenne, Wyo.	11,690		Leavenworth, Kan.	19,768	20,822 ('95)	Rochester, N. Y.	133,896	144,834 ('95)
Chicago, Ill.	1,099,850	1,619,226 ('96)	Lewiston, Me.	21,701		Rockford, Ill.	23,584	
Cincinnati, Ohio	296,908		Lexington, Ky.	21,567		Rock Springs, Wyo.	3,406	
Cleveland, Ohio	261,353		Lincoln, Neb.	55,154		Rutland, Vt.	11,760	
Colorado Springs, Col.	11,140		Little Rock, Ark.	25,874		Sacramento, Cal.	26,386	
Columbia, S. C.	15,353		Logan, Utah.	4,565	5,756 ('95)	Saginaw, Mich.	46,322	44,642 ('94)
Columbus, Ga.	17,303		Los Angeles, Cal.	50,395		St. Albans, Vt.	7,771	
Columbus, Ohio	88,150		Louisville, Ky.	161,129		St. Augustine, Fla.	4,742	4,151 ('95)
Concord, N. H.	17,004		Lowell, Mass.	77,696	84,367 ('95)	St. Joseph, Mo.	52,324	
Council Bluffs, Iowa ..	21,474	20,189 ('95)	Lynchburg, Va.	19,709		St. Louis, Mo.	451,770	
Covington, Ky.	37,371		Lynn, Mass.	55,727	62,354 ('95)	St. Paul, Minn.	133,156	140,292 ('95)
Cumberland, Md.	12,729		Macon, Ga.	22,746		Salem, Mass.	30,801	34,473 ('95)
Dallas, Tex.	38,067		Madison, Wis.	13,426	15,950 ('95)	Salem, Ore.	10,470	
Davenport, Iowa	26,872	30,010 ('95)	Manchester, N. H.	44,126		Salt Lake City, Utah ..	44,843	48,076 ('95)
Dayton, Ohio	61,220		Memphis, Tenn.	64,495		San Antonio, Tex.	37,673	
Deadwood, S. D.	2,366	4,204 ('95)	Meriden, Conn.	21,652		San Diego, Cal.	16,159	
Denver, Col.	106,713		Meridian, Miss.	10,624		San Francisco, Cal.	298,997	
Des Moines, Iowa	50,093	56,359 ('95)	Milwaukee, Wis.	204,468	249,290 ('95)	San Jose, Cal.	18,060	
Detroit, Mich.	205,876	237,837 ('94)	Minneapolis, Minn.	164,738	192,833 ('95)	Santa Fé, N. M.	6,185	
Dover, Del.	3,061		Mobile, Ala.	31,076		Savannah, Ga.	43,189	
Dover, N. H.	12,790		Montgomery, Ala.	21,883		Scranton, Pa.	75,215	
Dubuque, Iowa	30,311	40,574 ('95)	Montpelier, Vt.	4,160		Seattle, Wash.	42,837	
Duluth, Minn.	33,115	59,396 ('95)	Nashua, N. H.	19,311		Selma, Ala.	7,622	
Durham, N. C.	5,485		Nashville, Tenn.	76,168		Shreveport, La.	11,979	
Elgin, Ill.	17,823		Natchez, Miss.	10,101		Sioux City, Iowa	37,806	27,371 ('95)
Elizabeth, N. J.	37,764	43,834 ('95)	New Albany, Ind.	21,059		Sioux Falls, S. D.	10,177	9,002 ('95)
Elmira, N. Y.	30,893	29,911 ('92)	Newark, N. J.	181,830	215,806 ('95)	Somerville, Mass.	40,152	52,200 ('95)
Erie, Pa.	40,634		New Bedford, Mass.	40,733	55,251 ('96)	South Bend, Ind.	21,819	
Evansville, Ind.	50,756		Newbern, N. C.	7,843		South Omaha, Neb.	8,062	
Fall River, Mass.	74,398	89,203 ('95)	New Britain, Conn.	16,519		Spartanburg, S. C.	5,544	
Fargo, N. D.	5,664		New Haven, Conn.	81,298		Spokane, Wash.	19,922	
Fort Smith, Ark.	11,311		New Orleans, La.	242,039		Springfield, Ill.	24,963	
Fort Wayne, Ind.	85,393		Newport, Ky.	24,918		Springfield, Mass.	44,179	51,522 ('95)
Fort Worth, Tex.	23,076		Newport, R. I.	19,457	21,537 ('95)	Springfield, Mo.	21,850	
Frankfort, Ky.	7,892		Newport News, Va.	4,449		Springfield, Ohio	31,895	
Galveston, Tex.	29,084		New York, N. Y.		3,500,000 ('98)	Stockton, Cal.	14,424	
Gloucester, Mass.	24,651	28,211 ('95)	New York	1,515,301	1,801,639 ('92)	Superior, Wis.	11,933	26,168 ('95)
Grand Forks, N. D.	4,979		Brooklyn	806,343	957,163 ('92)	Syracuse, N. Y.	88,143	91,994 ('92)
Grand Rapids, Mich.	60,278	79,424 ('94)	Long Island City	30,506	35,745 ('92)	Tacoma, Wash.	36,006	
Great Falls, Mont.	3,979		Norfolk, Va.	34,871		Tallahassee, Fla.	2,934	3,931 ('95)
Greenville, Miss.	6,658		Oakland, Cal.	48,682		Tampa, Fla.	5,532	15,634 ('95)
Greenville, S. C.	8,607		Ogden, Utah.	14,889	15,828 ('95)	Taunton, Mass.	25,448	27,115 ('95)
Guthrie, Okla.	2,788		Oklahoma, Okla.	4,151		Terre Haute, Ind.	30,217	
Harrisburg, Pa.	89,385		Olympia, Wash.	4,698		Toledo, Ohio	81,494	
Hartford, Conn.	53,230		Omaha, Neb.	140,452		Topeka, Kan.	81,007	80,151 ('95)
Haverhill, Mass.	27,412	30,209 ('95)	Oshkosh, Wis.	22,536	26,947 ('95)	Trenton, N. J.	57,458	62,518 ('95)
Helena, Mont.	13,834		Parkersburg, W. Va.	8,408		Troy, N. Y.	60,956	64,986 ('95)
Hoboken, N. J.	43,648	54,083 ('95)	Paterson, N. J.	78,347	97,344 ('95)	Tucson, Ariz.	5,150	
Holyoke, Mass.	35,637	40,322 ('95)	Pawtucket, R. I.	27,633	32,573 ('95)	Utica, N. Y.	44,007	46,608 ('95)
Hot Springs, Ark.	8,066		Pensacola, Fla.	11,750	14,084 ('95)	Vicksburg, Miss.	13,373	
Houston, Tex.	27,557		Peoria, Ill.	41,024		Virginia City, Nev.	8,511	
Huntington, W. Va.	10,108		Petersburg, Va.	22,680		Waco, Tex.	14,445	
Huntsville, Ala.	7,995		Philadelphia, Pa.	1,046,964		Washington, D. C.	230,392	
Indianapolis, Ind.	105,496		Phoenix, Ariz.	3,152		Waterbury, Conn.	28,646	
Jackson, Miss.	5,920		Pierre, S. D.	3,235	1,776 ('95)	Wheeling, W. Va.	34,522	
Jacksonville, Fla.	17,201	25,130 ('95)	Pine Bluff, Ark.	9,952		Wichita, Kan.	23,853	20,841 ('95)
Jefferson City, Mo.	6,742		Pittsburg, Pa.	238,617		Wilkesbarre, Pa.	37,718	
Jersey City, N. J.	163,003	182,713 ('95)	Portland, Me.	36,425		Williamsport, Pa.	27,132	
Joliet, Ill.	23,264		Portland, Ore.	46,385	81,342 ('95)	Wilmington, Del.	61,431	
Kansas City, Kan.	38,316	40,676 ('95)	Portsmouth, N. H.	9,827		Wilmington, N. C.	20,356	
Kansas City, Mo.	182,716		Providence, R. I.	132,146	145,472 ('95)	Winona, Minn.	18,208	20,649 ('95)
Key West, Fla.	18,080	16,502 ('95)	Provo City, Utah	5,159	5,992 ('95)	Winston, N. C.	8,018	
Knoxville, Tenn.	22,535		Pueblo, Col.	24,558		Woonsocket, R. I.	20,830	24,468 ('95)
La Crosse, Wis.	25,090	28,769 ('95)	Quincy, Ill.	81,494		Worcester, Mass.	84,655	98,767 ('95)
Lancaster, Pa.	32,011		Racine, Wis.	21,014	24,889 ('95)	Yonkers, N. Y.	32,033	31,419 ('95)
Lansing, Mich.	18,102	15,847 ('94)	Raleigh, N. C.	12,678		Youngstown, Ohio	33,220	

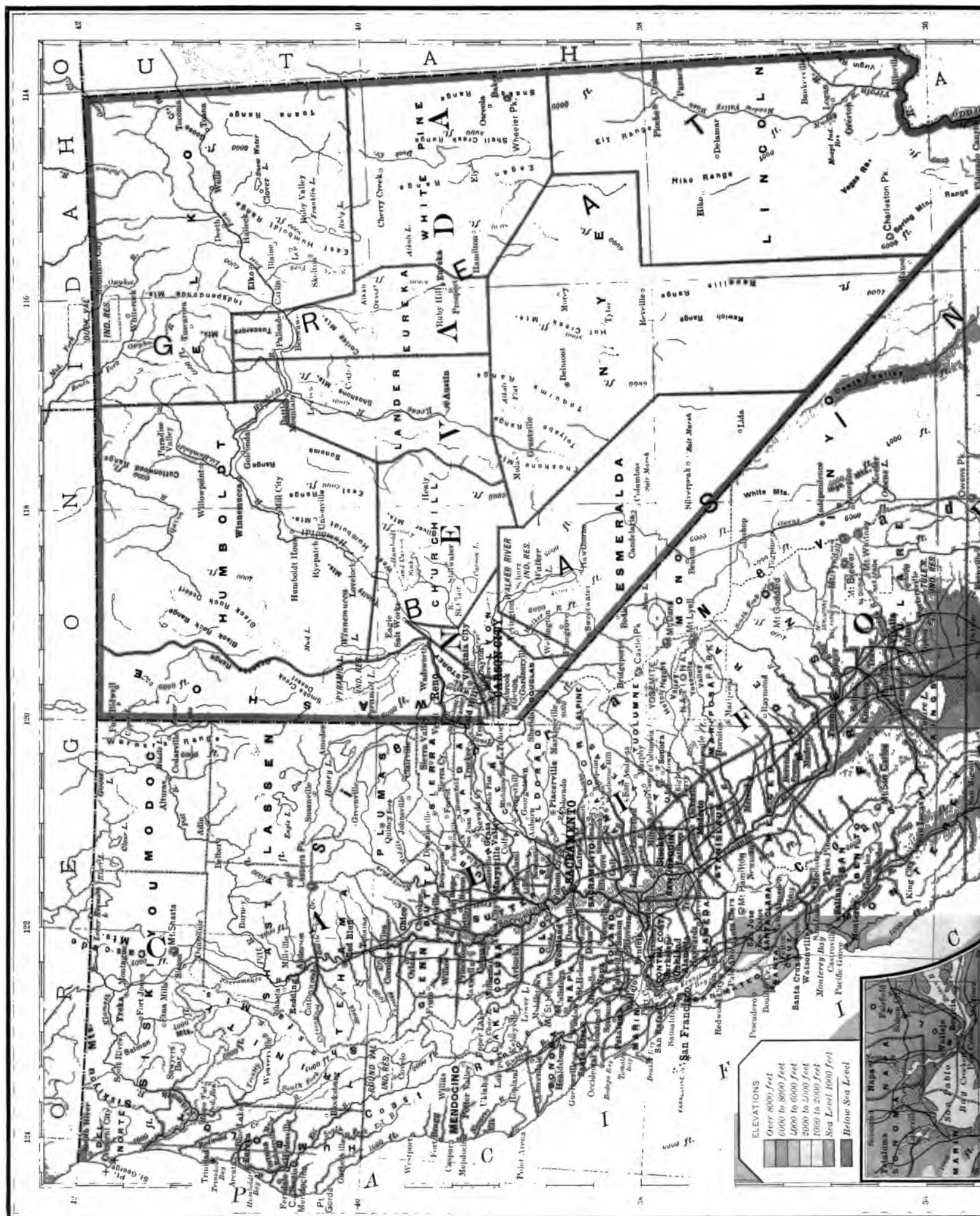
POPULATION OF FOREIGN CITIES.

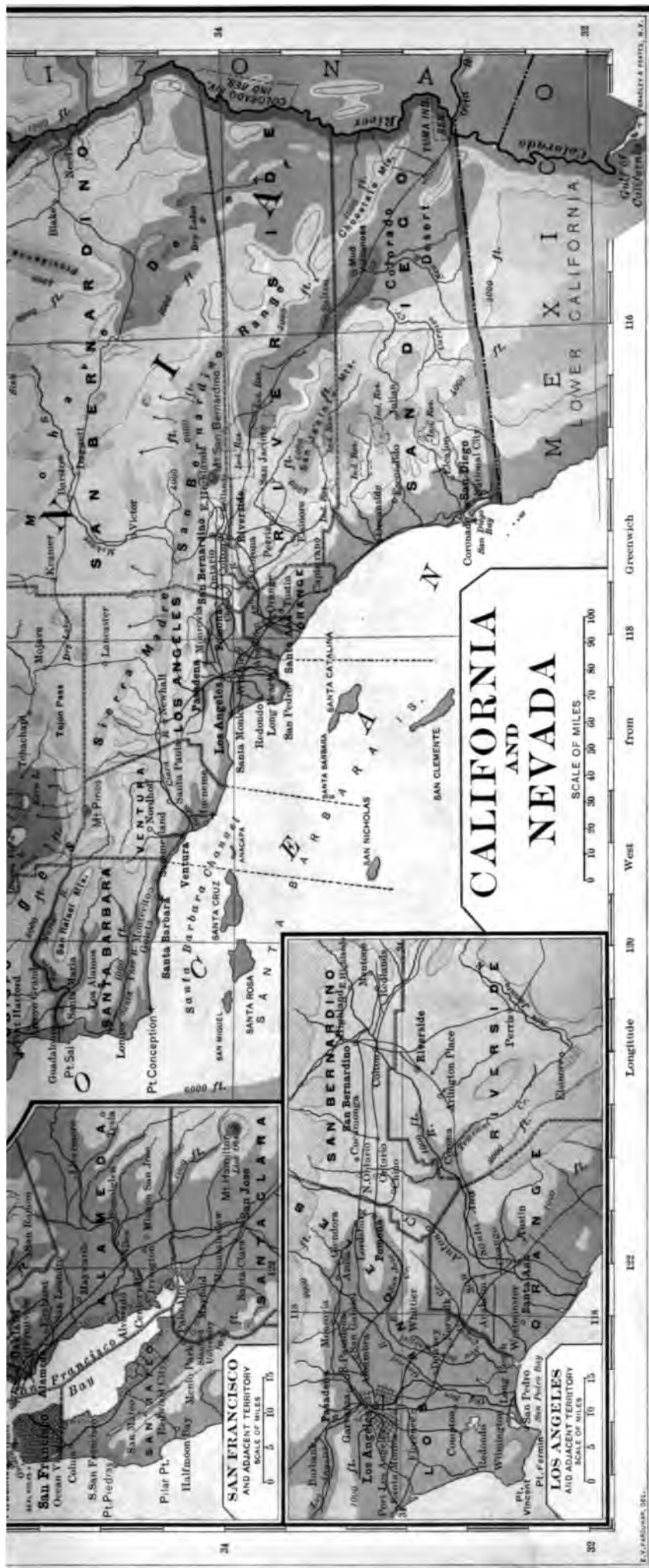
Aberdeen, Scotland ...	124,943	('91)	Barranquilla, Colom. ...	40,000		Brisbane, Australia ...	95,000	('95)	Chillan, Chile ...	28,738	(
Adelaide, Australia ...	144,352	('95)	Basel, Switzerland ...	89,687	('97)	Bristol, England ...	230,623	('96)	Christiania, Norway ...	148,213	(
Alexandria, Egypt ...	319,767	('97)	Batavia, Java ...	114,566	('95)	Brussels, Belgium ...	194,505	('96)	Cochabamba, Bolivia ...	29,530	(
Algiers, Algeria ...	92,120	('96)	Beirut, Turkey ...	120,000		Budapest, Hungary ...	491,938	('90)	Cologne, Germany ...	321,564	(
Allahabad, India ...	175,246	('91)	Belfast, Ireland ...	255,950	('91)	Buenos Aires, Arg. ...	725,554	('97)	Colombo, Ceylon ...	126,926	(
Amsterdam, Neth. ...	494,189	('96)	Belgrade, Servia ...	59,237	('97)	Bukharest, Roumania ...	232,009	('94)	Concepcion, Chile ...	39,837	(
Antofagasta, Chile ...	13,530	('95)	Benares, India ...	219,467	('91)	Bushire, Persia ...	20,000		Constantinople, Turk. ...	873,565	(
Antwerp, Belgium ...	267,902	('96)	Bergen, Norway ...	52,803	('91)	Cairo, Egypt ...	576,400	('97)	Copenhagen, Denmark ...	312,859	(
Arequipa, Peru ...	30,000	('89)	Berlin, Germany ...	1,677,304	('95)	Calcutta, India ...	810,786	('91)	Cordova, Argentina ...	47,609	(
Asuncion, Paraguay ...	45,000		Bern, Switzerland ...	49,030	('97)	Callao, Peru ...	35,000	('89)	Cuzco, Peru ...	22,000	(
Athens, Greece ...	111,486	('96)	Bilbao, Spain ...	50,772	('87)	Canton, China ...	2,000,000	('96)	Damascus, Turkey ...	150,000	(
Auckland, N. Zealand ...	31,424	('96)	Birmingham, England ...	501,241	('96)	Cape Town, Cape Col. ...	51,251	('91)	Danzig, Germany ...	125,605	(
Bagdad, Turkey ...	145,000		Bloemfontein, Or. Fr. St. ...	5,817	('92)	Caracas, Venezuela ...	72,429	('91)	Delhi, India ...	192,579	(
Bahia, Brazil ...	200,000	('92)	Bogota, Colombia ...	120,000	('86)	Cardiff, Wales ...	162,690	('96)	Dresden, Germany ...	336,440	(
Baku, Transcaucasia ...	112,253	('97)	Bologna, Italy ...	151,206	('96)	Catania, Italy ...	127,117	('96)	Dublin, Ireland ...	245,001	(
Ballarat, Australia ...	24,257	('91)	Bombay, India ...	821,764	('91)	Cawnpur, India ...	188,712	('91)	Dundee, Scotland ...	153,587	(
Bangalore, India ...	180,366	('91)	Bordeaux, France ...	256,906	('96)	Cayenne, Fr. Guiana ...	12,351		Dunedin, New Zealand ...	22,815	(
Bangkok, Siam ...	200,000		Bradford, England ...	228,809	('96)	Cetinje, Montenegro ...	2,920		Dusseldorf, Germany ...	175,985	(
Barcelona, Spain ...	272,481	('87)	Bremen, Germany ...	141,894	('95)	Charlottetown, Canada ...	11,374	('91)	Edinburgh, Scotland ...	263,646	(
Barfush, Persia ...	50,000		Breslau, Germany ...	378,250	('95)	Chemnitz, Germany ...	161,017	('95)	Essen, Germany ...	96,128	(

INDEX AND PRONOUNCING VOCABULARY.

KEY.—VOWELS: *ä* in *late*, *ä* in *fät*, *ä* in *cäre*, *ä* in *fär*, *ä* in *läst*, *ä* in *fall*, *ä* in *was*, *ä* in *final*, *au* in *author*; *ë* in *më*, *ë* in *mët*, *bërry*, *ë* in *veil*, *ë* in *tërm*, *ë* in *novel*; *i* in *fine*, *i* in *tin*, *i* in *police*, *i* in *basin*; *ö* in *nöte*, *ö* in *nöt*, *ö* in *sön*, *ö* in *för*, *ö* in *dö*; *ü* in *tüne*, *ü* in *nüt*, *ü* in *rude* (= *g*), *ü* in *full*, *ü* = French *u*, *ua* = *wa*, *ue* = *we*; *y* in *my*, *y* in *hymn*. CONSONANTS: *ç* in *cent*, *machine*, *e* in *can*; *g* in *gem*, *g* in *get*; *k* = German *ch*; *ng* = *ng*, *n* like *ny* in *barnyard*, *n* = *ng* but is silent; *z* = *z*; *th* in *thine*; *x* = *gz*. *Italic letters are silent.*

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are each 10,000 feet or more in height. Mount Whitney, the highest, has an altitude of 14,522 feet. Other great elevations are Mounts Tyndall (14,386 feet), Brewer (13,886 feet), Lyell (13,042 feet), Dana (12,992 feet), and Castle Peak (12,500 feet). Mount Shasta, a magnificent snow-clad volcanic cone in the northern part of the state, is more than 14,000 feet high. Lassen's Peak (about 10,400 feet) is second in importance to Mount Shasta among the extinct volcanoes of northern California. Both of these peaks, though often spoken of as belonging to the Sierra Nevada, are more closely associated geologically with the Cascade Mountains, which stretch northward from them through Oregon and Washington. Sixty-five glaciers from half a mile to two miles in length exist in California, most of them on the north sides of the highest mountains; and there are many indications that these glaciers were much more extensive at some time in the past.

The Coast Ranges extend in a broad, broken belt along the western side of the state. They include many ridges, generally parallel with the shore, and have numerous long spurs on the west. The total width of the Coast Ranges is almost equal to that of the Sierra, but their average height is not half so great. At the Golden Gate the mountains are broken down, making a grand outlet to the ocean.

To the east of San Francisco and of the hills of Contra Costa stands Mount Diablo (3849 feet), which is the most prominent elevation of the Coast Ranges in this part of the state. Mount St. Helena (about 4350 feet), rising at the head of the lovely Napa valley, is also very conspicuous, and is a beautiful height.

In southern California the Coast Ranges merge into a confused mass of mountains and hills extending beyond the Mexican boundary. They are highest east of Los Angeles, and are there called the San Bernardino Range. North of Los Angeles they are known as the Sierra Madre; and farther west, where they merge with the Coast Ranges, they are called the mountains of San Buena Ventura. The loftiest peak is Mount San Bernardino (11,600 feet).

Valleys. Where is the great central valley of California? What is the general character of its slope? By what two great rivers is it drained? What has already been said of some parts of the Mohave Desert?

The great central valley is about 400 miles long and from 20 to 50 miles wide. The area of the entire basin is computed to be about 65,000 square miles, of which nearly 20,000 square miles is comparatively level. The western parts are lower than the eastern, while of course all parts slope toward the two main rivers by which the valley is drained.

In the heart of the Sierra, about 150 miles east of San Francisco, is the famous Yosemite Valley. This chasm is six miles in length and from half a mile to a mile wide. Its almost vertical granite walls rise from 3000 to 5000 feet. From the top of these cliffs the Merced River and its tributaries fall in grand cataracts from 400 to 1600 feet in height.

Congress in 1864 granted this valley to California for a public park, and in 1891 the United States government established the Yosemite National Park, which includes 42 townships. It embraces the state park and the drainage basin about it, preserving the forest and water courses. It includes also the Hetch Hetchy Valley,



Yosemite Valley.

which resembles the Yosemite, although not equal to it in grandeur. The highest point in the National Park is Mount Lyell.

Southward from Yosemite Park are the General Grant and the Sequoia National parks in the grand *Sequoia gigantea* forests; and northeast of these forest parks, on the middle and south forks of Kings River, are two magnificent canyon valleys like the Yosemite and Hetch Hetchy.

Between the western spurs of the Coast Ranges, and running northwest, there are many river valleys which drain into the Pacific. Some of these are extensive and very fertile. The Salinas River valley is one of the largest. The valleys of the Santa Ana, Santa Clara, Napa, Sonoma, Russian, and Eel rivers are also important and interesting.

A strip along the southwest coast, including the western parts of Santa Barbara, Ventura, Los Angeles, and San Diego counties, has been called the Garden of California. East of this there are fertile valleys,—San Bernardino, Riverside, and others,—which are thickly settled.

East and southeast of the Sierra there lies an arid region covering nearly one fourth of the state. It belongs mainly to the Great Basin, and is one of the driest and most barren parts of the earth's surface. It includes the sandy and rocky Mohave Desert, stretching between the Sierra and the Colorado River, and also comprises a part of the Colorado Desert. This region has but few inhabitants.

Other Regions. In the northeastern part of the state there is a rocky plateau, high, bleak, and sterile, broken by short mountain ranges, and traversed by the Pitt River with its deep gorges. It is the lake region of California, and a part of it lies in the Great Basin. In this rugged district there are many beds of lava and volcanic ashes.

Above the great central valley, north of the parallel of 40° and west of Mount Shasta, is a rough, complicated mountain region including the high and rugged plateau of the Klamath.

Drainage. Which is the largest river in the state? In what direction does it flow? What river flowing in the opposite direction joins it, and where do they unite? What great region do they together drain? What bay do they enter? Through what other bodies of water do they reach the Pacific? What rivers enter the Pacific north of San Francisco; south of that city? What river forms part of the boundary of the state?

What lakes are in the northeastern part; on or near the eastern boundary? Name other lakes in the state.

Except the Sacramento and the San Joaquin, the rivers of California are small, and their importance lies in their service to agriculture, mining, and manufactures. The Sacramento is about 400 miles long. It rises in the elevated region near Mount Shasta, and soon unites with Pitt River, which is properly regarded as the upper course of the same stream. It is navigable for light steamers for more than 250 miles from its mouth. Many of its tributaries, of which the Feather, Yuba, and American rivers are the chief, flow through deep mountain gorges.

Owing to the considerable rainfall on the western slopes of the Sierra, and to the melting snow on the high mountains, many of the streams flowing thence carry a large volume of water even in the dry season. This is not the case, however, with the streams from the eastern slopes of the Coast Ranges. In the dry season most of these sink and disappear soon after leaving the foothills. Most of the permanent water courses on this side of the great central valley rise north of Clear Lake in Lake county.

The head waters of the San Joaquin take their rise at the foot of a glacier near the summit of Mount Lyell. The south fork of this river rises near Mount Goddard. The San Joaquin is about 350 miles long, flows southwest for 100 miles, then northwest, and finally joins the Sacramento not far east of Suisun Bay. It is navigable for steamers to Stockton. For a considerable distance from Suisun Bay the Sacramento and San Joaquin rivers are bordered by tule swamps. The principal tributaries of the San Joaquin are the Merced, Tuolumne, Fresno, Stanislaus, Calaveras, and Mokelumne rivers, all rising in the Sierra. The San Joaquin has no western tributaries.



Lake Tahoe.

The south and main fork of the Tuolumne, rising in a glacier on the north side of Mount Lyell, flows through the Big Canyon, which is noted for its grand scenery.

Of the rivers flowing directly to the Pacific the largest is the Klamath, which rises in Oregon. From what lake does it issue to enter California? Other important coast rivers are the Eel, Russian, and Salinas. Except the last, the streams from the Coast Ranges south of San Francisco usually sink in the dry season, flowing slowly through gravel and sand to the ocean.

The Colorado, though forming a part of the southeastern boundary of



Wheat Harvester.

ature varies much in different parts of the state, depending largely upon distance from the ocean, the influence of mountains, and elevation above the sea. Relatively, in summer, the weather is cool on the coast and hot in the interior valleys. The sea causes comparative uniformity between the north and the south, but from east to west the changes are very rapid. Within a few miles of the ocean the climate is one of the most equable in the world.

In general there are two seasons—the dry, from May to November, and the rainy, from November to May. Snow seldom falls in any but the mountain regions, although the long, severe rainstorms from the southwest are sometimes followed by cold waves, or even by sharp northers.

The average yearly rainfall decreases quite regularly from nearly 80 inches in the extreme northwest to about 4 inches in the southeast corner. At San Diego it is about 10 inches, and at San Francisco 25 inches. For the entire state it is about 20 inches—not more than half that of the Atlantic coast.

Where the heaviest rainfall occurs, north of Cape Mendocino, the prevailing winds are from the northwest. Below that point, in all but the winter months, westerly winds prevail. These come from the Pacific, where they have been cooled by the Alaska current.

In winter the coast waters are warmer than the land, and the winds blowing from the ocean moderate the cold. Thus at all seasons of the year the climate is modified by the prevailing winds, which have always a nearly uniform temperature. The northeast wind, coming from a desert region, is in summer dry and hot. It oftenest occurs in June and September, and is sometimes hot enough to parch the crops. The cyclonic winds which move landward from the Pacific carry with them an immense amount of moisture, which is precipitated as rain in the valleys and on the foothills, and as snow on the Sierra.

The ocean winds enter the great central valley through the San Francisco water gap—the Golden Gate. Among the foothills in this region the summer is quite warm, the temperature ranging from 85° to 95°, and even to 100° or more; but the severity of the heat is much lessened by the dryness of the air and the coolness of the nights. The rainy season here, though sometimes chilly, usually has many agreeable qualities. In the high Sierra the winters are long and cold, but the summer middays are often as warm there as they are on the coast.

In the Great Basin region east of the Sierra in the Mohave Desert the climate is very severe; the summer heat is killing, the winter is bitterly cold.

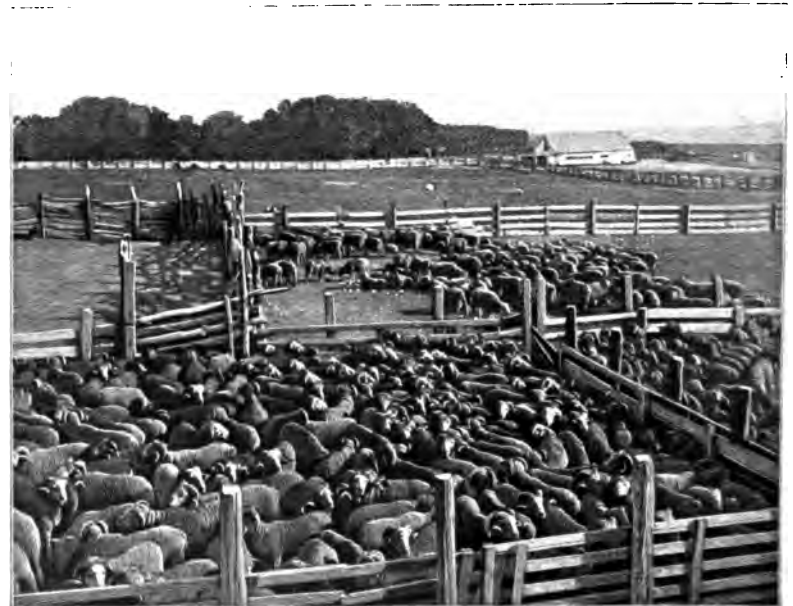
Fogs are frequent along the coast in both summer and winter. In winter they often extend far inland, modifying the temperature by checking the radiation of heat. In the dry season they afford grateful moisture to vegetation.

RESOURCES AND INDUSTRIES.

Vegetation. There are more than 100 species of forest trees in California, the most important of which are conifers. Great forests cover the Coast Ranges and the western slopes of the Sierra, where the rainfall is heavy. They extend from the northern boundary to about latitude 36° 30'.

On the Sierra the main forest belt reaches from about 4000 to 9000 feet above sea level. Farther up, to a height of from 10,000 to 12,000 feet, are found junipers, hemlock, and alpine species of pines. On the foothills and in the coast valleys there are sparse growths of oaks, pines, and various kinds of underwoods. On the eastern slope of the Sierra there are open groves of large yellow pine, silver fir, nut pine, and many varieties of shrubs. The great central valley, though mostly treeless, has some of the noblest parklike expanses of oak woods to be found in the world. The southeastern portion of the state is almost destitute of trees. California is rich in flowers of many species. The California buckeye, various species of *Ceanothus*, and manzanita are widely distributed. These, with thorny shrubs and scrub oaks, form dense thickets called chaparral.

The most remarkable forest growths are the two species of *Sequoia*, the giant sequoia (*Sequoia gigantea*) or “big tree” of the Sierra and the towering redwood (*Sequoia sempervirens*) of the Coast Ranges. No other species of *Sequoia* is known to exist on the globe. The giant sequoia, though exceeded in height by an Australian eucalyptus, is the grandest tree that grows. It is distributed in groves and forests along the western flank of the Sierra, from the middle fork of the American River to the head of Deer



Sheep Ranch.

Grape-growing is an industry of the first importance. The vine flourishes in nearly all parts of the interior below an elevation of 4000 feet. The annual wine product is from 15,000,000 to 20,000,000 gallons, two thirds of which is exported. In the hot, dry interior basins great quantities of grapes are made into raisins, of which several million boxes are exported annually. More than half the raisins consumed in our country are supplied by California.

Plums, peaches, pears, apples, cherries, prunes, apricots, nectarines, figs, and olives thrive in most parts of the state. Oranges, lemons, limes, and walnuts, almonds, and other nuts grow in southern California and in the valleys of the Sacramento and San Joaquin. Strawberries, raspberries, blackberries, currants, and other small fruits are grown and canned in large quantities. Strawberries are marketed in every month except January and February. In several



Raisin Vineyard.

For 20 years after the discovery of gold, mining was the leading industry of California; then it became second to agriculture. Gold deposits exist from the Oregon boundary to the Colorado Desert, but by far the greater part of the gold-mining has been done in the northern half of the Sierra Nevada and among the Shasta and Siskiyou mountains. Mines in the southern desert regions, especially in the famous Rand district about Randsburg, have been extensively opened up.

The gold obtained from California in 1897 was valued at about \$15,000,000, being a little more than one fourth of the total product of the United States. Since 1848 California is estimated to have produced in gold more than \$1,200,000,000. Experts declare that there is still more gold in the mines of the state than has been taken out.

Gold is obtained from quartz mines by crushing the gold-bearing quartz rock, and from gravel banks by washing away the earth. Many methods are employed in gold-mining, and California has some of the finest mining machinery in the country.

Silver is found in many places in California. There are mines of this metal in the southern part and on the eastern slope of the Sierra. Quicksilver is a valuable product, of which California supplies nearly all that is obtained in our country. It occurs in the Coast Ranges from Los Angeles county to Trinity.

Copper ore is found in Fresno, Calaveras, Nevada, Shasta, and other counties. The Shasta belt is especially important. Bituminous coal and lignite are mined in the Coast Ranges and in the great central valley.



Gathering Grapes.

southern counties bee culture is carried on, and much fine honey is exported.

Successful agriculture in many parts of the state depends on irrigation. The practice of irrigation really began in California before the nineteenth century, but although several million acres are now irrigated, it is yet only local. In addition to the mountain streams, artesian wells are a valuable aid in irrigation. Of these there are thousands in California. Some in the Santa Ana River basin, the San Joaquin valley, and elsewhere, have a flow of over 1,000,000 gallons a day. Irrigation is also assisted in many places by windmills and steam pumps for raising water from wells.

Mineral Productions. Of all the resources of California none are more extraordinary than her mineral treasures. Chief among these are the immense gold deposits, from which vast wealth has been derived, and which are still among the richest in the world.



Grape Crusher.



Library, University of California.

coast from that point to San Francisco. About these missions they gathered the Indians, and taught and employed them.

Spanish dominion lasted until 1821. In that year Mexico declared her independence of Spain, and in 1824 California became a territory of the republic of Mexico.

The Mexican rule continued till 1846, when, mainly through the action of American settlers, the independence of California was asserted and, with United States military aid, maintained, the authority of our government being established here in 1847. Meanwhile the Mexican war was in progress. It was ended February 2, 1848, by the treaty of Guadalupe Hidalgo, whereby California, with other territory, was formally ceded to the United States. Just before the conclusion of this treaty the great discovery of gold was made, from which dates the rapid growth of California and its development into a leading state of the Union.

Reports of gold in California had come from Drake and others before the seventeenth century, and the Mexicans had probably found gold here. But in January, 1848, came the discovery that aroused the world, when James Wilson Marshall (from New Jersey) found gold grains in the tailrace of John A. Sutter's mill, in what is now the township of Coloma, Eldorado county. Soon the gold-bearing nature of the region was widely known, and the precious area rapidly enlarged under the search of an ever-increasing number of prospectors. The excitement spread throughout the world, and was followed by a rush of gold seekers, who have been termed "Argonauts." Within a few months there were tens of thousands of them in California. They came overland and by water, some crossing the Isthmus of Panama, and others sailing round Cape Horn.

Many of them fell by the way from hardship, disease, and Indian assault, but still the vast army increased. The great harbor of San Francisco was quickly crowded with the ships of different nations, and a strange city of tents and sheds sprang up. This was to be rapidly replaced by the noble metropolis at the Golden Gate.

California was admitted to the Union as a state September 9, 1850. During the next few years there was a struggle for supremacy

between the lawless and the law-abiding in the new community, resulting in the complete establishment of social order. The subsequent growth of the state was normal and steady. Her career of prosperity has followed from the supplementing of mineral industries by the development of her vast agricultural and manufacturing resources, and from her liberal provision for public education and advancement.

During the civil war California remained faithful to the Union, and with men and treasure generously maintained its cause.

The population of the state increased from 92,597 in 1850 to 379,994 in 1860. In 1890 it was 1,208,130. It is now estimated at 1,600,000.

Government. The legislative department consists of a senate and an assembly. Senators are elected for four years, and members of the assembly for two years. The sessions of the legislature are biennial.

The executive department includes a governor, lieutenant-governor, secretary of state, controller, treasurer, attorney-general, surveyor-general, and superintendent of public instruction, all elected for four years.

The judicial department comprises the senate sitting as a court of impeachment, a supreme court, superior courts, justices of the peace, and such inferior courts as the legislature may establish.

California is divided into 57 counties. The state has 2 senators and 7 representatives in Congress, and 9 votes in the electoral college.

Education. The constitution provides that a free school shall be kept up and supported in every district of the state for at least six months of the year.

The state possesses a large school fund, and also raises annually by taxation for support of the public schools about \$3,000,000. Each county has a board of education and a superintendent, and in every school district there is a board of trustees. High schools are maintained in the cities and larger towns throughout the state.

The University of California at Berkeley is free to young men and women. It is largely endowed, and is one of the best equipped and most progressive institutions in the country. It has received a large bequest for the erection of new buildings on its extensive grounds overlooking the Golden Gate.



Encina Hall, Leland Stanford Junior University.

which is located here, San Jose has several educational institutions that maintain a high standing.

San Diego, the county seat of San Diego county, has one of the best harbors, after that of San Francisco, on the Pacific coast. On account of its equable climate, it is a favorite summer and winter resort. It carries on an active trade with Lower California, and exports much fruit and honey.

Stockton, the county seat of San Joaquin county, on the Stockton navigable channel, which connects the city with the San Joaquin River, carries on an extensive and active trade with the surrounding country in wheat, wool, and other agricultural products. Here are important and varied manufactures, including agricultural implements, flour, carriages, and many other articles. The schools of Stockton are excellent, and the city has a fine public library.

Alameda, contiguous to Oakland on the south, is, like the latter city, an attractive place of residence for people doing business in San Francisco.

Fresno, the county seat of Fresno county, is the trade center of a large vine- and fruit-growing region, made fertile by irrigation, and noted for the production of raisins.

Berkeley, adjoining Oakland on the north, is not only the seat of the University of California, but also of the State Deaf, Dumb, and Blind Asylum. It has various manufactures.

Pasadena, in Los Angeles county, is a favorite health resort and residence city, beautifully situated on high, well-drained mesa land, nine miles north of Los Angeles. It is the center of a great fruit district.

Santa Ana, the county seat of Orange county, is a flourishing city in a rich agricultural and horticultural region. It has ample transportation facilities, a large trade, and some manufactures.

Santa Barbara, the county seat of Santa Barbara county, is on the sea-coast, in a beautiful region of fruits and flowers, and is a noted health resort with a delightful climate.

San Bernardino, the county seat of San Bernardino county, is surrounded by vineyards and orange groves. It has many artesian wells.

Bakersfield, Kern county, railroad machine shops and other manufactures; center of fruit and agricultural region. *Benicia*, Solano county, tanneries, agricultural works, fruit and fish canneries, pottery works, shipyard; United States arsenal and barracks. *Chico*, Butte county, large



State Capitol, Sacramento.

trade in farm products, fresh and dried fruits, lumber, and mining supplies. *Eureka*, Humboldt county, on Humboldt Bay, in redwood region, and in an agricultural, fruit, and dairying district; seaport of northern California; many sawmills; large lumber trade. *Grass Valley*, Nevada county, thriving city in a region of extensive quartz mines. *Marysville*, Yuba county, large mining and agricultural trade; variety of manufactures. *Modesto*, Stanislaus county, center of a fine farming region. *Monterey*, Monterey county, on Monterey Bay, fashionable summer resort. *Napa*, Napa county, commands the large trade of Napa valley; various important manufactures. *Nevada City*, Nevada county, center of an extensive gold quartz mining district.

Petaluma, Sonoma county, shipping point for farm products of the county; extensive manufactures. *Placerville*, Eldorado county, large trade in agricultural and mining supplies; a center of deciduous fruit industry. *Pomona*, Los Angeles county, in rich fruit region; olive-oil works and other manufactures; good schools; public library. *Red Bluff*, Tehama county, at head of steamer navigation on the Sacramento, large trade in farm products and lumber. *Redding*, Shasta county, trade center of a large district. *Redlands*, San Bernardino county, extensive fruit and lumber business. *Riverside*, Riverside county, beautiful, thriving city; center of rich orange district. *Salinas*, Monterey county, large business in flour and lumber. *San Luis Obispo*, in county of same name, and in fine fruit-growing and agricultural district; various manufactures. *San Rafael*, Marin county, on San Francisco Bay, in a great dairying region; summer resort. *Santa Cruz*, Santa Cruz county, noted summer resort for sea bathing; varied manufactures. *Santa Rosa*, Sonoma county, business center of fertile Russian River valley. *Vallejo*, Solano county, on San Pablo Bay, large flour mills and other manufactures; United States navy yard on Mare Island near the city. *Ventura*, in county of same name, important business in oil, lumber, and asphaltum. *Visalia*, Tulare county, center of large grain and fruit region in San Joaquin valley. *Watsonville*, Santa Cruz county, beet sugar, fruit and lumber industries. *Woodland*, Yolo county, flourishing city in fine agricultural and fruit district; variety of manufactures; superior educational facilities. *Yreka*, Siskiyou county, in extreme northern part of California, trade center of large farming, lumbering, fruit, and gold-mining region. Most of these places are county seats.



Steam Wagon Train.

tain large areas of good land. But tillage in Nevada chiefly depends on irrigation, which is extensively employed.

RESOURCES AND INDUSTRIES.

Vegetation. The chief timber region of the state lies on the eastern slopes of the Sierra Nevada. Here are forests of pine, fir, spruce, cedar, and other trees. The interior mountains bear sparse growths of piñon or nut pine, juniper, and mountain mahogany.

Along the streams are scattered cottonwoods, willows, birches, and wild cherries. The dry alkaline valleys, especially in the north, bear little but sagebrush, grease wood, and other coarse vegetation. In the tule swamps about Humboldt and Carson sinks is found a kind of sugar cane. Southern Nevada is largely covered with mesquite and cacti. On the hills grows nutritious bunch grass. By the rivers clover is sometimes seen.

Animals. Among the native animals are the bighorn or mountain sheep, antelope, bear, wolf, wolverene, coyote, long-tailed fox, badger, mink, ermine, hare, and muskrat.

The birds include sage grouse, quail, ducks, prairie chickens, white brant, blue herons, cranes, bitterns, hawks, owls, woodpeckers, finches, and titmice. In the streams and fresh-water lakes are fine trout, and Carson Lake abounds with chubs, mullets, and other fishes.

Minerals and Mining. A great resource of Nevada is its mineral wealth, and one of its largest industrial interests is mining. There are rich mineral deposits in the Carson Lake region. The gold and silver mines of the Comstock lode on Mount Davidson have been wonderfully productive, as have others in the state. In the Carson region there are also vast borax beds, and deposits of salt, soda, chalk, coal, peat, and quicksilver. In the Eureka district there are silver-lead mines. Copper is mined near Golconda, Humboldt county, and at various other places. At Steamboat sulphur and cinnabar are found.

Other minerals in the state include lead, antimony, bismuth, nickel, cobalt, and manganese; also gypsum, mica, graphite, and kaolin and other clays. In the mountains, granites, limestones, porphyry, slate, and lava and trap rocks make up the principal formations, and excellent building stones are abundant.

Mineral springs, both hot and cold, are numerous, and some are noted health resorts. Can you name any of these?

Agriculture. In regions of permanent streams and in irrigated districts like Walker, Carson, Truckee, Hum-

boldt, and Paradise valleys, all the cereals, fruits, and vegetables common to these latitudes can be raised. Wheat, barley, hay, alfalfa, potatoes, and sugar beets are important crops.

Figs, dates, oranges, and other semitropical fruits, also some cotton and tobacco, are grown in the Colorado valley.

Stock-raising is a large industry. The native grasses afford good summer pasture, and also cure on the ground into natural hay, which, together with white sage and other herbaceous plants, provides winter feed.

Commerce. Nevada is traversed from northeast to southwest by a great trunk line of railroad, and has a number of connecting lines, so that the chief centers of population and industry have ample facilities for transportation and trade, both within and beyond the state. The total length of railroads in Nevada is more than 1000 miles.

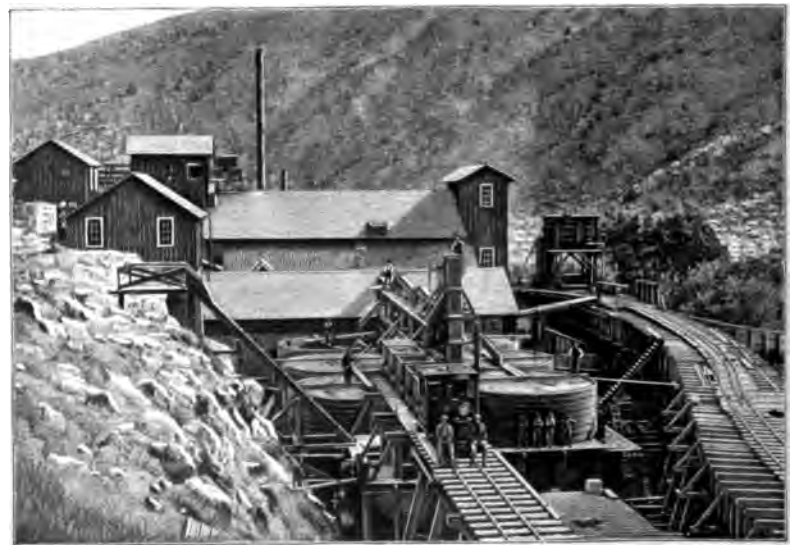
HISTORY.

This state takes its name, in Spanish meaning "snowy," from the Sierra Nevada ("snowy mountains") on its western boundary. The first European to enter within the present limits of the state was probably Francisco Garcés, a Franciscan father, while on a missionary exploration in 1775. In 1825 Peter Skeen Ogden, of the Hudson Bay Company, discovered the Humboldt River. After that time American and other trappers frequently found their way into the country.

The first white man to cross the Sierra and the entire breadth of Nevada was Jedediah S. Smith, who made the journey from west to east in 1827. In 1833 the noted trapper, guide, and soldier, Kit Carson, followed the Humboldt (then the Ogden) River from its head waters to the sink.

About this time emigrants to California and Oregon began passing through Nevada. In 1845 Fremont entered it near Pilot Peak and crossed to California.

Nevada had been a part of the Upper California of the Spaniards and Mexicans. It was ceded to the United States by Mexico in 1848, at the close of the Mexican war. All but the extreme southern part was included in the territory of Utah in 1850, whence most of it was transferred to Nevada territory when it was organized in 1861, and the rest to the state of Nevada in 1866.



Gold Mill, Virginia City.

The Boundaries of Ecuador.

As stated on page 108 of the Natural Advanced Geography, the boundaries of few of the South American republics are definitely settled. This is particularly true of Ecuador. Along her northern border is a wild, forest-covered region embracing about 100,000 square miles that is claimed by both Ecuador and Colombia; and on the southern border a region nearly half as large is claimed by both Ecuador and Peru. Between these border lands claimed by her more progressive and powerful neighbors there remains in the actual possession of Ecuador only a triangular wedge-shaped tract with an area of about 117,000 square miles.

No boundary treaties having been mutually ratified between Ecuador and either of her neighbors, the maps issued by Ecuadorian authorities naturally include in that country all of the disputed territory, which gives to the republic the shape of an irregular trapezoid about 750 miles long, with an average width of about 330 miles, and an area of $(750 \times 330 =)$ 247,500 square miles. On the other hand the maps issued by Colombia and Peru include the territory claimed by those republics, thus cutting Ecuador down to the triangular wedge having a base in the west of about 450 miles, and its apex in the east about 520 miles from the Pacific, and having an area of about $(\frac{450 \times 520}{2} =)$ 117,000 square miles.

It thus happens that Atlases, Encyclopedias, and School Geographies differ among themselves respecting the shape and size of Ecuador: some reproducing the Ecuadorian claims and giving the country the shape of a large trapezoid

Among the Geographical publications which have adopted the small triangular area for Ecuador are :

	SQ. MILES.
Rand, McNally & Co.'s Atlas of the World, 1897, page 165, "about 120,000 sq. mi." (including Galapagos Islands, 3,000 sq. mi.), or on mainland . . .	117,000
* Bureau of American Republics, Commercial Directory, 1897, ECUADOR, on mainland . . .	117,000
Statesman's Year Book, 1898, on mainland . . .	117,600
Wagner and Supan's Die Bevölkerung der Erde, 1891 . . .	115,665
Longmans' Gazetteer, 1895 . . .	116,000
Meyers Konversations Lexikon, 1894 . . .	115,665
Lippincott's Gazetteer (Edition of 1895)	115,630
Appletons' Cyclopedia (Annual Volume for 1897), on mainland . . .	117,000
Natural Geographies, 1898, mainland portion . . .	115,680
Rand-McNally's Grammar School Geography, 1895, 118,630 sq. mi. (including Galapagos Islands, 3,000 sq. mi.), or mainland portion . . .	115,630

Several of the above publications in addition to giving the small area, describe the triangular form of Ecuador, which has been adopted in the Natural Geographies.

It is only in publications issued fifteen or twenty years ago, including *old editions* of several of the above works, that the area of Ecuador is given in conformity with its trapezoidal shape, thus :

* The maps of the South American countries published by the Bureau of American Republics do not pretend to show anything more than the territory *claimed* by each country. Thus the Bureau maps of Ecuador, Peru, and Colombia *overlap* one another in the disputed territory, the two last-named leaving to Ecuador only the triangular wedge shown in the diagram.

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